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### CERTAIN NUTRITIVE DISORDERS OF LIVE-STOCK.

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THE extension of settlement in New Zealand on the one hand, and on the other the (comparatively) prolonged use without manuring of pastures on inferior soil, have had the effect of bringing to light the fact that certain properties exist in this country wherein the soil is presumably lacking in a sufficient supply of one or more of the constituents necessary for rendering plant-growth capable of maintaining the animal body in perfect health. Fortunately, with one exception, these known are at present few in number, and not extensive in area.

The exception referred to is the large expanse of country, approximately about one million acres, on which cattle and sheep become affected with so-called "bush sickness." I do not in this article propose to go into detail concerning this, as it has already been fully dealt with in the August, 1912, issue of the *Journal*,\* and

\* "Bush Sickness": C. J. Reakes, D.V.Sc., M.R.C.V.S. (Vol. v, p. 118). "The Chemistry of Bush Sickness": B. C. Aston, F.I.C. (Vol. v, p. 121).

is still the subject of a thorough and exhaustive investigation. As previously stated in the *Journal*, this investigation, so far as it has gone, indicates that a deficiency of available iron in the volcanic soil of which the affected area is composed, and the resultant deficiency of assimilable iron in the herbage, is the cause of the trouble; and the further results attained support this opinion, all the animals described as grazing upon paddocks manured with the object of rendering more iron available for absorption by the herbage still remaining free from any indication of bush sickness.

Another form of malnutrition affecting cattle was investigated some months since by myself in conjunction with Mr. A. R. Young, Veterinary Supervisor for the district, who brought the matter under notice. This occurred on farms in north Taranaki, the soil of which was of a light volcanic nature, and, at its best, never first-class land. The trouble made its appearance on paddocks which had been down in grass for several years, and had never received manurial treatment of any kind. The animals affected were milking-cows, and the symptoms were a gradual loss of condition, progressing until the animals became extremely weak and emaciated, remaining in this condition often for months, sometimes showing temporary improvement, often followed by a relapse, frequently resulting in death unless proper treatment were applied. In addition to this, two well-marked symptoms were present: first, a peculiar action of the fore limbs in movement, strongly suggestive of severe rheumatism, or a cramped condition of the muscles of the fore-quarters, this being sometimes so pronounced as to cause the animal to be temporarily unable from time to time to keep on its feet, the skin covering the knee-joints being consequently markedly abraded. The second marked symptom was the presence of enlargements on some of the ribs (the number of ribs affected varying in different animals), situated at about the junction of their upper and middle thirds. These enlargements involved an area on each rib, slightly varying in size, but averaging about  $1\frac{1}{2}$  in. in length from above downwards, and extending right across the bone. They were raised to a height of from  $\frac{1}{8}$  in. to  $\frac{1}{2}$  in. above the proper surface of the rib, and with a few exceptions were present on both its outer and inner aspects. In well-marked cases their presence could be detected during life by passing the hand along the side, a little above the middle line of the chest-wall. When the affected bones were removed from the carcase and grasped at each end they broke without great strength being exerted, the break always occurring through the enlargements, which were found to consist of bony tissue softer than normal.

Mr. Young, who with the Inspector of Stock for the district, Mr. H. Munro, had devoted considerable time to inquiring into this

trouble, had found that cases only occurred on certain farms, and that these farms were all situated on land where the soil was not of first-class quality, and where manures had not been applied to the pastures. The frequent recurrence of cases in individual farms suggested the possibility of an infectious form of disease, but bacteriological work failed to reveal any indications of this. Neither could the presence of blood-parasites be demonstrated. The fact was, however, elicited that, on certain farms where cases had occurred, the trouble had entirely ceased after the pastures had been top-dressed with basic slag.

Two typical cases were found on one old-settled farm, the animals affected being milking-cows. The paddock in which they were



TWO HEALTHY STEERS ON TREATED PASTURE AFTER TWO YEARS' GRAZING.

*B. C. Aston, photo.]*

depasturing consisted of light, porous, volcanic soil, and had been down in grass for at least seventeen years, no manurial top-dressings of any kind having been applied to it. Both these cows were well-marked cases, one especially being in an extremely weak and emaciated condition, and hardly able to walk. By way of confirming the opinion formed as to the cause of the trouble, both were treated medicinally, being given 1 oz. of compound syrup of phosphate of iron (Parrish's chemical food) twice daily. Improvement was observed very shortly after the administration of the medicine was commenced, and, it being persevered with, both animals made a complete recovery. No analyses of any of the soils or grasses were made at the time, but the opinion formed was that the whole trouble was the result of the soil having become depleted of phosphoric acid, or some other nutrient, to a sufficient extent to be unable to supply the plant-food necessary for



proper animal nutrition. As was shown by the practical experience of farmers, top-dressing with basic slag was a reliable preventive measure, and, of course, was most beneficial to the pasture also, and to the stock grazing upon it, by producing more feed of better quality. In all probability the use of superphosphate would give a similar result. Among the constituents of a good class of basic slag are—Iron-oxides (12.50 per cent.); phosphoric anhydride (18.85 per cent.); lime ( $\text{CaO}$ ), (46.40 per cent.).

Another condition of malnutrition found resulting from soil-deficiency due to natural causes and not to gradual depletion, is that known as "osteomalacia," or, as described in the 1910 Annual Report, "osseous cachexia." In all typical cases met with in this country sheep (hoggets) have been the victims, but in other countries milch-cows have been usually found to exhibit the disease. The first investigation made here was carried out by Mr. H. A. Reid, F.R.C.V.S., in conjunction with Mr. B. C. Aston, F.I.C., Agricultural Chemist, on a station property in the Wellington Province, near the east coast. This was fully described in the 1910 Report of the Department (see pp. 33 and 47), and in the November, 1910 *Journal* (Vol. i, p. 422); but for the convenience of readers of the *Journal* the following extracts from that report are here included. Concerning the symptoms and course of the disease Mr. Reid stated,—

"This process of demineralization of the bone is slow and insidious in its onset and course. At first only slight loss of condition may be noticeable, indicated by a ragged and unhealthy appearance of the fleece. The wool feels dry and harsh to the touch, has lost its lustre, and may be readily detached. This condition is followed by progressive emaciation. Affected sheep are listless, disinclined to move, lie for a considerable time, and rise with difficulty. When made to walk, they often appear lame, and in well-marked cases a creaking or cracking sound may be heard. Spontaneous fractures are frequent, and sheep may be found with a leg and several other bones of the body broken. Handling affected sheep is liable to lead to fracture of one or other bone. The broken bones do not heal readily. The bones themselves are extremely thin and light, having been converted into shell-like structures by the resorption of their lime salts. The marrow of the long bones generally is congested, hæmorrhagic, and often gelatinous. The osseous tissue itself appears to be exceptionally porous, and has undergone rarefaction."

In dealing with the matter from the chemical standpoint Mr. Aston made the following remarks. (It should be noted that the owner possessed also another property—termed here "property No. 2"—where the soil conditions were entirely different, and were excellent in every way.)

"In travelling across the country one cannot but be struck by the difference in the soil and its natural covering at property No. 2, where the sheep were bred, and at and beyond property No. 1, where the disease developed. At No. 2 the underlying rock is a soft limestone, and the surface soil an easily worked loam. The original flora is mixed forest, containing great trees and shrubs one usually finds growing on rich soil. On the affected area the natural covering is manuka, tauhinu (*Pomaderris*), and rushes, plants usually found growing on poor, dry soil. The difference in the rainfall (including the number of rainy days) must be considerable. I wish to lay stress on the difference in the two types of country, as it appears to me that the sudden change from a rich to a poor soil may have been the largest, if not the sole, factor in the occurrence of the disease.



SUCCESSFUL RESULT OF TOP-DRESSING BUSH-SICK PASTURE.

A healthy wether sheep after two years' grazing on treated pasture.

*B. C. Aston, photo.]*

"Considerable time was spent by the owner and myself in taking samples of soil from different sites on his affected block of country. Samples were taken from the tops of high flats and from the valleys. There is very little difference in the results of analyses of these samples: they are not abnormally different in plant-food content from many of the soils on which sheep are successfully grazed throughout the Dominion. When, however, we examine the analysis of the No. 2 (home farm) soil, the striking fact that it is tremendously rich in available and total phosphoric acid at once becomes apparent. The quantity of this mineral nutrient available is six times as great as on the affected soils. The total quantity present is at least three times as great.

"According to Cadeac, Leblanc, and Carougeau ('Principles of Veterinary Surgery'), the character of the soil affects the nutritive

value of its flora. The influence of droughts on vegetation has often been responsible for the disease, as it leads to the growth of feeds having a dearth of nutritive elements, especially of salts, which, lacking water as a conveyance, remain incorporated in the soil. The use of phosphates and superphosphates as manure has given good results, according to the authors. The use of fodder obtained from districts where the disease is unknown is also advisable."

The result of the investigation was that the evidence obtained pointed to the trouble being due to a deficiency of phosphoric acid in the soil, and consequently a lack of phosphate of lime in the herbage. Hoggets, having to provide for growth as well as for the maintenance of bodily health, naturally suffered most from this deficiency of lime salts, and the food not containing enough of these to meet the requirements of the body, the animals had, so to speak, to draw upon their own systems, and thus the bones became gradually denuded of the lime phosphate of which they are largely composed, and became soft and friable in consequence. This year two other instances have occurred of similar trouble in hoggets making its appearance. One of these was in the Marlborough Province, and the other near the east coast of the Wellington Province, near where the cases investigated in 1910 were found. As regards Marlborough, the trouble was not very serious, and when the facts came under notice it had ceased for the time. Steps have, however, been taken to assist the owner to avoid a recurrence of loss. In the second case further investigation is still in progress. Mr. W. G. Taylor, M.R.C.V.S., Government Veterinarian, has visited the affected farms, and gone into the matter from a veterinary standpoint, and Mr. Aston is now taking up the chemical side of it. At least four farms are involved, and on these it has been present for from three to seven years past. Mr. Taylor reports that the losses this year have been approximately—Farm A, 17 per cent.; farm B, 9 per cent.; farm C, 45 per cent.; farm D, 25 per cent. He also makes the following observations in his inquiry into the matter, from which it will be noted that the condition is similar to that investigated by Mr. Reid:—

"This disease, which has been recognized on the Continent as occurring in cattle and pigs, is attributed to a lack of available lime salts in the soil—that is, of the assimilable phosphate of lime. In those cases which have been investigated here it has been found that the soil is largely deficient in the phosphatic element. The disease is characterized by emaciation, staring fleece dry with loss of yolk. One often sees a profuse diarrhoea, which has an offensive odour. Later there appear febrile symptoms, and at this stage the wool is easily pulled out, the eye has a staring, glassy appearance, the mouth is dry and clammy, and intense thirst is shown, the hoggets remaining close to a water-supply. On *post mortem* the lesions found are intense



emaciation, the muscular tissues being anæmic in appearance, no fat under the skin, and hardly any in any region of the body. The main feature is the condition of the bones. The long round bones are found to be normal in colour externally. They are easily broken, and on examining the centre of these bones it is found that much of the marrow is replaced by a gelatinous-looking material. The flat bones and vertebræ, although externally they appear normal, also show marked changes, and in places one often finds pockets of gelatinous material. In advanced stages of the disease the affected bones can be cut easily with an ordinary knife."

The facts detailed above are worthy of the careful attention of all farmers on pastoral farms, illustrating as they do, on the one hand, that on poorer land especially it is a necessity for continued profitable farming that the soil be not allowed to become depleted of plant-food constituents necessary for the proper maintenance of animal health, and, on the other, that virgin soil itself may be deficient. It should be borne in mind that cases such as those described are extreme instances of the results of soil-deficiency. There are doubtless other farms whereon, though disease conditions are not openly apparent, the occupants are not reaping the profits they should be, owing to their stock not thriving so well, and not yielding so much in the shape of milk, beef, wool, or mutton as would be the case were the process of gradual depletion of necessary soil-constituents not going on. Moreover, the lack of bodily vigour resulting from the lessened nutritive value of the food-plants consequent upon this condition of the soil renders stock less capable of resisting the attacks of parasitic disease, of tuberculosis, and other affections, when subjected to their attacks. Good farming methods are essential in all classes of land if the best return is to be obtained, and on land not of first-class quality they are naturally especially necessary, and one obvious important feature in them lies in the proper application of suitable manures.

The cases now under investigation were only brought to our notice after losses had been experienced for years previously, and this leads me to believe it possible that similar trouble may possibly be present in other districts. It is sincerely hoped that, should this be the case, the owners will bring it under notice. The Department will be glad to do everything possible to help them to get over the trouble, and to prevent its recurrence in the future.

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An interesting preliminary test as to the feeding-value of prairie-grass is being made at the Ruakura Farm of Instruction. So far very promising results have been obtained, the grass having held out well under heavy stocking.

## SEED - TESTING.

A. H. COCKAYNE.

COCKSFOOT (*Dactylis glomerata*).

ALL the cocksfoot-seed used in New Zealand is produced locally, and there is a large export trade. For many years nearly all the seed was harvested in Canterbury, especially on Banks Peninsula, and sold under the general name "Akaroa" cocksfoot. Owing to the high price of this seed last year and the early part of this season, a good deal of seed of most excellent quality was gathered in the North Island. Up till quite recently nearly all the cocksfoot was grown on steep hillsides, necessitating hand cutting with sickles and hand threshing with flails. Now, however, there is a good deal grown on level ground that can be cut with a reaper-and-binder, while the portable oil-engine may in time eliminate hand threshing to a large extent. The outstanding feature of the growing crop of the past season in the Akaroa district was the great development of vetches and tares that completely spoilt large areas. Again, the weather-conditions were so bad that the sheaves had to lie exposed for a long period, with the result that the ripest and heaviest seed fell out, and that saved suffered considerably thereby in colour. The bushel weight of southern cocksfoot this season was light for this reason. Seed weighing over 16 lb. per bushel was the exception, and large amounts of dressed seed did not exceed 14 lb. The cleaning of cocksfoot during the past two seasons has not been so thorough as in past years. It has been customary to remove as many double heads as possible, but owing to the price of the seed a good many of these double heads, which in Europe are counted as impurities, are now left in the dressed seed. The extraneous seeds are, however, carefully cleaned out, so that New Zealand seed does not contain a large percentage of weeds. The price, which was abnormally high at the beginning of the season, dropped rapidly when the 1912 crop was placed on the market, and the comparatively small area laid down to grass in the North Island, owing to the inability to secure "burns," has tended to materially reduce the price. To the farmer cocksfoot will always be New Zealand's most important grass, as it forms the basis of the permanent pastures in nearly all parts of the Dominion.

*Number of Seeds per Pound.*

The number of seeds per pound of cocksfoot varies considerably. In general the higher the bushel-weight the smaller is the number of



seeds per pound; 16 lb. seed averages about 620,000 seeds per pound, while special lines weighing about 20 lb. per bushel will contain not more than 520,000 seeds in each pound.

### Germination.

Of twenty-seven samples tested for germination an average of 74 per cent. was secured, with a maximum of 99 and a minimum of 43 per cent:—

3 samples germinated between 90 and 100 per cent.

|    |   |    |   |    |   |
|----|---|----|---|----|---|
| 11 | „ | 80 | „ | 90 | „ |
| 10 | „ | 70 | „ | 80 | „ |
| 2  | „ | 60 | „ | 70 | „ |
| 1  | „ | 40 | „ | 50 | „ |

The average germination of these cocksfoot samples may be considered low when compared with the Zurich average, which is 83 per cent. over a long period of years. It must be remembered, however, that the New Zealand tests are conducted with all the seeds of a sample, and many may be more or less imperfectly matured. Such seeds are not tested under the European method, but are classed as impurities. Thus the average purity of New Zealand exported seed tested in Europe is about 86 per cent. Such seed when tested here would in many cases be classed as quite 98-per-cent. purity. All the seed, provided it is cocksfoot, irrespective of whether the seed contains developed kernels, is reckoned as pure seed. This explains the difference both in the germination and purity of our cocksfoot over European standards. In reality the cocksfoot examined showed a much higher real value than does the average European seed.

### Extraneous Seeds.

Seventeen lines of cocksfoot yielded thirty-one different kinds of extraneous seeds. Their names and relative frequency were as follow:—

|   | occurred in 16 of the samples. |
|---|--------------------------------|
| 1. Yorkshire fog ( <i>Holcus lanatus</i> )      | 16                             |
| 2. Catsear ( <i>Hypochaeris radicata</i> )      | 13                             |
| 3. Goose-grass ( <i>Bromus hordeaceus</i> )     | 13                             |
| 4. Perennial rye ( <i>Lolium perenne</i> )      | 8                              |
| 5. Curled dock ( <i>Rumex crispus</i> )         | 5                              |
| 6. Hair-grass ( <i>Festuca bromoides</i> )      | 5                              |
| 7. Rib-grass ( <i>Plantago lanceolata</i> )     | 3                              |
| 8. Ergot ( <i>Claviceps purpurea</i> )—a fungus | 2                              |
| 9. Wild turnip ( <i>Brassica campestris</i> )   | 2                              |
| 10. Sorrel ( <i>Rumex acetosella</i> )          | 2                              |
| 11. Hawkweed ( <i>Crepis capillaris</i> )       | 2                              |
| 12. Wireweed ( <i>Polygonum aviculare</i> )     | 2                              |
| 13. Red clover ( <i>Trifolium pratense</i> )    | 2                              |
| 14. Toad-rush (head) ( <i>Juncus bufonius</i> ) | 1                              |

|   |                               |
|---|-------------------------------|
| 15. White clover ( <i>Trifolium repens</i> )        | occurred in 1 of the samples. |
| 16. Alsike ( <i>Trifolium hybridum</i> )            | " 1 "                         |
| 17. Spear thistle ( <i>Carduus lanceolatus</i> )    | " 1 "                         |
| 18. Kentucky blue-grass ( <i>Poa pratensis</i> )    | " 1 "                         |
| 19. Hard fescue ( <i>Festuca duriuscula</i> )       | " 1 "                         |
| 20. Crosted dogstail ( <i>Cynosurus cristatus</i> ) | " 1 "                         |
| 21. American cress ( <i>Barbarea praecox</i> )      | " 1 "                         |
| 22. Oat ( <i>Avena sativa</i> )                     | " 1 "                         |
| 23. Scentless mayweed ( <i>Matricaria inodora</i> ) | " 1 "                         |
| 24. Bindweed ( <i>Polygonum Convolvulus</i> )       | " 1 "                         |
| 25. Smartweed ( <i>Polygonum Persicaria</i> )       | " 1 "                         |
| 26. Sedge ( <i>Carex</i> sp.)                       | " 1 "                         |
| 27. Fathen ( <i>Chenopodium album</i> )             | " 1 "                         |
| 28. Vetch ( <i>Vicia sativa</i> )                   | " 1 "                         |
| 29. Prickly sowthistle ( <i>Sonchus asper</i> )     | " 1 "                         |
| 30. Sowthistle ( <i>Sonchus oleraceus</i> )         | " 1 "                         |
| 31. Timothy ( <i>Phleum pratense</i> )              | " 1 "                         |

The combined presence of Yorkshire fog, catsear, and goose-grass is generally indicative of New Zealand seed.

### RED CLOVER (*Trifolium pratense*).

Under "red clover" are grouped both cow-grass and red clover. The seeds of these two clovers cannot be distinguished from one another. True cow-grass seed is said to be larger and brighter than red clover, but the first character is a variable one, and the second depends to a large extent upon the amount of polishing that occurs during cleaning. A fair amount of red clover is harvested in New Zealand, mainly in Canterbury and Blenheim, but the majority of the seed used is imported. So far as New Zealand seed is concerned, I consider that the bulk of it is not cow-grass, although it is generally sold under that name. In certain parts of New Zealand the perennial form of red clover appears to persist for many years, but in general, and especially in sheep-pastures, this clover is quite a temporary one and occupies a very insignificant position in old pastures. Red clover, or, as it is generally termed, cow-grass, is almost invariably sown in New Zealand in all grass mixtures, both for temporary or permanent pastures, the amount used per acre in the former case being much more than in the latter, when not more than 2 lb. is practically ever used. Cow-grass is generally sown with a cereal crop in the South Island, and, in conjunction with rye-grass, provides good feed almost as soon as the white crop has been harvested.

### Germination.

The average germination of fifty-one samples was 87 per cent., with a maximum of 100 and a minimum of 43 per cent. If from these are taken eight samples that were old seed, and gave an average germination of 60 per cent., the average for the other forty-three samples was 91 per cent.

33 samples germinated between 90 and 100 per cent.

|   |   |    |   |    |   |
|---|---|----|---|----|---|
| 9 | " | 80 | " | 90 | " |
| 1 | " | 70 | " | 80 | " |
| 3 | " | 60 | " | 70 | " |
| 2 | " | 50 | " | 60 | " |
| 3 | " | 40 | " | 50 | " |

The percentage of hard seed averaged 5 per cent., with a maximum of 16 per cent., and a minimum of nil. New-Zealand-grown seed contained in nearly every instance a higher percentage of hard seeds than did that imported. The majority of these hard seeds will probably germinate under ordinary field conditions.

### Extraneous Seeds.

The twenty-eight samples examined for purity contained fifty-seven different kinds of extraneous seeds. Their names and relative frequency of occurrence were as follow:—

|  | occurred in 25 of the samples. |
|--|--------------------------------|
| 1. Rib-grass ( <i>Plantago lanceolata</i> )              | " 13 "                         |
| 2. Perennial rye ( <i>Lolium perenne</i> )               | " 11 "                         |
| 3. Yellow trefoil ( <i>Medicago lupulina</i> )           | " 8 "                          |
| 4. Curled dock ( <i>Rumex crispus</i> )                  | " 8 "                          |
| 5. Pigeon-grass ( <i>Setaria glauca</i> )                | " 8 "                          |
| 6. Wild carrot ( <i>Daucus carota</i> )                  | " 7 "                          |
| 7. Night-flowering catchfly ( <i>Silene noctiflora</i> ) | " 7 "                          |
| 8. Field-madder ( <i>Sherardia arvensis</i> )            | " 7 "                          |
| 9. Selfheal ( <i>Prunella vulgaris</i> )                 | " 6 "                          |
| 10. White clover ( <i>Trifolium repens</i> )             | " 6 "                          |
| 11. Sorrel ( <i>Rumex acetosella</i> )                   | " 6 "                          |
| 12. Fathen ( <i>Chenopodium album</i> )                  | " 5 "                          |
| 13. Cut-leaved cranesbill ( <i>Geranium dissectum</i> )  | " 5 "                          |
| 14. Vervain ( <i>Verbena officinalis</i> )               | " 5 "                          |
| 15. Lucerne ( <i>Medicago sativa</i> )                   | " 4 "                          |
| 16. Spear thistle ( <i>Carduus lanceolatus</i> )         | " 4 "                          |
| 17. Wireweed ( <i>Polygonum aviculare</i> )              | " 3 "                          |
| 18. Alsike ( <i>Trifolium hybridum</i> )                 | " 3 "                          |
| 19. Wild parsley ( <i>Petroselinum sativum</i> )         | " 3 "                          |
| 20. Mallow ( <i>Malva</i> sp.)                           | " 3 "                          |
| 21. Chicory ( <i>Cichorium Intybus</i> )                 | " 3 "                          |
| 22. Yorkshire fog ( <i>Holcus lanatus</i> )              | " 3 "                          |
| 23. Sulla ( <i>Hedysarum coronarium</i> )                | " 2 "                          |
| 24. Spotted burr clover ( <i>Medicago maculata</i> )     | " 2 "                          |
| 25. Timothy ( <i>Phleum pratense</i> )                   | " 2 "                          |
| 26. Toothed burr clover ( <i>Medicago denticulata</i> )  | " 2 "                          |
| 27. Axeweed ( <i>Coronilla varia</i> )                   | " 1 "                          |
| 28. Bedstraw ( <i>Galium</i> sp.)                        | " 1 "                          |
| 29. Kentucky blue-grass ( <i>Poa pratensis</i> )         | " 1 "                          |
| 30. Crested dogtail ( <i>Cynosurus cristatus</i> )       | " 1 "                          |
| 31. Wild turnip ( <i>Brassica campestris</i> )           | " 1 "                          |
| 32. Rugel's plantain ( <i>Plantago Rugelii</i> )         | " 1 "                          |
| 33. Suckling clover ( <i>Trifolium minus</i> )           | " 1 "                          |
| 34. Catsear ( <i>Hypochaeris radicata</i> )              | " 1 "                          |
| 35. Clover dodder ( <i>Cuscuta trifolii</i> )            | " 1 "                          |
| 36. Cocksfoot ( <i>Dactylis glomerata</i> )              | " 1 "                          |
| 37. Yarrow ( <i>Achillea millefolium</i> )               | " 1 "                          |
| 38. Scentless mayweed ( <i>Matricaria inodora</i> )      | " 1 "                          |
| 39. Hawkweed ( <i>Crepis capillaris</i> )                | " 1 "                          |
| 40. American vervain ( <i>Verbena hastata</i> )          | " 1 "                          |
| 41. Pigeon-grass ( <i>Setaria viridis</i> )              | " 1 "                          |



|   |                              |
|---|------------------------------|
| 42. Birdsfoot trefoil ( <i>Lotus corniculatus</i> )             | ccurred in 1 of the samples. |
| 43. Star thistle ( <i>Centaurea</i> sp.)                        | " 1 "                        |
| 44. Nipplewort ( <i>Lapsana communis</i> )                      | " 1 "                        |
| 45. Ox-tongue ( <i>Picris</i> sp.)                              | " 1 "                        |
| 46. Prickly sowthistle ( <i>Sonchus asper</i> )                 | " 1 "                        |
| 47. Blueweed ( <i>Echium vulgare</i> )                          | " 1 "                        |
| 48. Greater birdsfoot trefoil ( <i>Lotus major</i> )            | " 1 "                        |
| 49. Greater mouse-eared chickweed ( <i>Cerastium vulgatum</i> ) | " 1 "                        |
| 50. Field-dodder ( <i>Cuscuta arvensis</i> )                    | " 1 "                        |
| 51. Pigweed ( <i>Amaranthus retroflexus</i> )                   | " 1 "                        |
| 52. Scarlet pimpernel ( <i>Anagallis arvensis</i> )             | " 1 "                        |
| 53. Mint ( <i>Mentha</i> sp.)                                   | " 1 "                        |
| 54. Knotted hedge-parsley ( <i>Torilis nodosa</i> )             | " 1 "                        |
| 55. Ox-tongue ( <i>Picris echinoides</i> )                      | " 1 "                        |
| 56. Canary-grass ( <i>Phalaris</i> sp.)                         | " 1 "                        |
| 57. Bracted plantain ( <i>Plantago aristata</i> )               | " 1 "                        |

The following plants, seeds of which were present, have not yet become naturalized in New Zealand: (1) *Coronilla varia*; (2) *Plantago Rugelii*; (3) *Plantago aristata*; (4) *Verbena hastata*; (5) *Torilis nodosa*. The first-named is a source-indicator for Mediterranean red clover.

One sample of red clover examined contained over 40,000 extraneous seeds per pound, or 17 per cent. by numbers. They included 9,000 dodder-seeds, 16,000 sorrel-seeds, and 3,000 fathen-seeds. The germination of the seed was 54 per cent.

#### LUCERNE (*Medicago sativa*).

Lucerne at present occupies quite a minor position in New Zealand agriculture, but its value is becoming better recognized, and it is likely to take its proper place on the farm.

A fair amount of seed is produced in the Blenheim district, but the crop there this year has been a comparative failure. New-Zealand-produced seed is of very high quality, and compares well with the best Hunter River. With the extension of irrigation in Central Otago and an increase in lucerne-growing in general, large amounts of really excellent seed should be produced. The main quantity of the imported seed comes from France, with Hunter River next. Australian seed always commands the highest price on the market. Seed from other countries—Syria (Turkestan), America, Arabia, and occasionally small amounts from South America (Peru), are also imported.

#### Germination.

Eleven lines germinated an average of 90 per cent., with a maximum of 99 and a minimum of 74 per cent.

|  |   |    |        |
|--|---|----|--------|
| 6 samples germinated between 90 and 99 per cent. |   |    |        |
| 3  | " | 80 | " 90 " |
| 2  | " | 74 | " 80 " |

The average percentage of hard seeds was 7 per cent., with a maximum of 26 per cent., and a minimum of nil.

*Extraneous Seeds.*

Nine samples examined for purity contained thirty different kinds of extraneous seeds. Their names and frequency of occurrence were as follow :—

|   | occurred in | 8 of the samples. |
|---|-------------|-------------------|
| 1. Wireweed ( <i>Polygonum aviculare</i> )                | 7           | ..                |
| 2. Rib-grass ( <i>Plantago lanceolata</i> )               | 6           | ..                |
| 3. Red clover ( <i>Trifolium pratense</i> )               | 6           | ..                |
| 4. Fathen ( <i>Chenopodium album</i> )                    | 5           | ..                |
| 5. Chicory ( <i>Cichorium Intybus</i> )                   | 4           | ..                |
| 6. Pigeon-grass ( <i>Setaria glauca</i> )                 | 3           | ..                |
| 7. Pigeon-grass ( <i>Setaria viridis</i> )                | 3           | ..                |
| 8. Rocket ( <i>Eruca sativa</i> )                         | 3           | ..                |
| 9. Syrian star thistle ( <i>Centaurea Pictis</i> )        | 3           | ..                |
| 10. Curled dock ( <i>Rumex crispus</i> )                  | 2           | ..                |
| 11. Sorrel ( <i>Rumex acetosella</i> )                    | 2           | ..                |
| 12. Spear thistle ( <i>Carduus lanceolatus</i> )          | 2           | ..                |
| 13. Red millet ( <i>Panicum</i> sp.)                      | 2           | ..                |
| 14. Wild turnip ( <i>Brassica campestris</i> )            | 2           | ..                |
| 15. Barnyard millet ( <i>Panicum crus-galli</i> )         | 1           | ..                |
| 16. White clover ( <i>Trifolium repens</i> )              | 1           | ..                |
| 17. English trefoil ( <i>Medicago lupulina</i> )          | 1           | ..                |
| 18. Star thistle ( <i>Centaurea</i> sp.)                  | 1           | ..                |
| 19. Crested dogtail ( <i>Cynosurus cristatus</i> )        | 1           | ..                |
| 20. Dodder ( <i>Cuscuta</i> sp.)                          | 1           | ..                |
| 21. Perennial ryco-grass ( <i>Lolium perenne</i> )        | 1           | ..                |
| 22. Canary-grass ( <i>Phalaris canariensis</i> )          | 1           | ..                |
| 23. Night-flowering catchfly ( <i>Silene noctiflora</i> ) | 1           | ..                |
| 24. False flax ( <i>Camelina sativa</i> )                 | 1           | ..                |
| 25. Storkesbill ( <i>Erodium cicutarium</i> )             | 1           | ..                |
| 26. Hair-grass ( <i>Festuca bromoides</i> )               | 1           | ..                |
| 27. Yorkshire fog ( <i>Holcus lanatus</i> )               | 1           | ..                |
| 28. Field-cress ( <i>Lepidium Draba</i> )                 | 1           | ..                |
| 29. Water-wireweed ( <i>Polygonum Hydropiper</i> )        | 1           | ..                |
| 30. Fenugreek ( <i>Trigonella</i> sp.)                    | 1           | ..                |

Mediterranean rocket (*Eruca sativa*), which up till last year was an extremely rare weed in New Zealand, was reported in the majority of the lucerne-fields that were sown. This indicated that the majority of the seed used was of European origin, rocket being a source-indicator for South European seed.

Syrian star thistle is also a source-indicator for Turkestan seed, and has not yet been naturalized in New Zealand. It is of importance to determine what extraneous seeds can be ranked as source-indicators for lucerne grown in each country from where it is exported, as it has been shown that seed from certain countries produced a much better stand in New Zealand than that from others. In general Asiatic seed appears to be decidedly inferior, and, as it generally is cheap, such seed is often sold under various names. I have recently examined seed reputed to be grown in Australia, France, and America, all of which was unmistakably Asiatic in origin.

The sum of £2,167,610 is provided in the French Budget of 1912 for expenditure on agriculture, or £16,363 more than in 1911.

## WESTERN WOLTHS GRASS.

### A FINE FORAGE PLANT.

A GREAT wealth of forage, 15 tons to the acre, is at present being cut for stock-feed at the Ruakura Farm of Instruction. It is the Western Wolths grass, a variety of rye-grass said to have originated from a plant plucked by the wayside by a Dutch peasant. At Ruakura it has undoubtedly given the heaviest yield of all rye-grasses, making a rapid dense growth and providing excellent spring feed, admirably adapted for cutting and carting out to stock. Sown on the 14th of last May, it was ready for feeding about the beginning of October. It is generally considered that a legume and non-legume combination, such as peas and oats, is the most desirable green crop, but this will give but a very poor second cut. Western Wolths, on the other hand, provides several excellent subsequent cuttings. Undoubtedly a grass which in a very wet season will give an abundance of feed at a critical time for dairy stock is of immense value. It is contended that such a crop as oats and peas is a better milk-producing ration, but at Ruakura the cows have milked just as well on the Western Wolths as on peas and oats. The new rye should provide excellent hay for horses. A fact which must not be overlooked is that Western Wolths grass is an insatiable devourer of plant-food, and that over a series of years leguminous crops may yield as great an amount of fodder without having exhausted fertility to anything like the same extent.

Reporting on this grass, Mr. A. H. Cockayne, the Department's Biologist, says:—

“Western Wolths rye-grass is a sport from the ordinary Italian rye-grass, characterized by its extremely rapid and vigorous growth. It stands as a striking example of the improvement of many of our cultivated grasses that can be effected by picking out those variations that possess characters more valuable to the farmer than does that form which is looked upon as the type. In most of our grasses the specific name really includes a large series of forms that apparently bred true from seed, and it is obvious that certain of them must be more valuable to the farmer than others. The selecting-out of those forms that appear to possess the most valuable characteristics is a work the value of which is now being fully recognized in the plant-breeding stations of Europe.





WESTERN WOLTHS GRASS BEING CARTED OUT FOR FEEDING TO STOCK AT RUAKURA.

So far as the seed of Western Wolths rye-grass is concerned, it is undistinguishable from ordinary Italian, and buyers of this seed will have to be careful to secure seed that can be guaranteed true to type. The impossibility of telling many agricultural varieties by the seed alone has led the European seed-growing associations to institute a vigorous inspection of all crops of what are generally termed pedigree seeds, so that their trueness to type can be effectively guaranteed.

## CLUB - R O O T.

### A RESISTANT SWEDE.

WHEN club-root became particularly troublesome in New Zealand swede crops the then Manager of the Moumahaki Experimental Farm, Mr. F. Gillanders, introduced a variety which was considered resistant to the disease. New Zealand experience confirmed that of England. The Manager of the Ruakura Farm of Instruction decided to further strengthen the resistant power of this variety by growing acclimatized seed from selected roots. The roots were chosen from the Moumahaki crops, and further selected roots from the descendants of these are now being grown at Ruakura for seed-production. The frontispiece illustration shows the Ruakura seed-growing plot. The framework is for carrying scrim, to protect the seed from small birds. The bulbs from which the seed is being produced were at the time the photograph was taken quite sound, a rather unusual experience, the bulb mostly becoming decayed as the seed-stalks reach maturity. The production of seed from selected roots is being made a feature of the work in the horticultural section of the Ruakura Farm.

“ I have seen these (seeds), though picked long before and tested with much care, yet for all that degenerate if human toil does not pick with the hand the largest, one by one, each year.”—*Virgil's "Georgics,"* B.C. 37.

**I**T is just as sensible for a butter-factory to pay for milk on its weight, instead of on its butter-fat content, as for the farmer to buy agricultural seeds without knowing their purity and germination. In both cases it is only good business to pay for the thing actually required—in the one case for the butter-fat ; in the other, for the desired seed capable of growing.

## LUCERNE.

## POSSIBILITIES OF THE GREAT FODDER PLANT IN NEW ZEALAND.

PRIMROSE MCCONNELL.

Now that it has been demonstrated that lucerne will grow successfully under diverse soil and climatic conditions in this country, it is well to consider how this great forage plant can be utilized to the best advantage by the New Zealand farmer. The first thing to be considered is that in those countries where lucerne occupies a dominant position the summer is drier than ours, while in Argentine, where 9,000,000 acres are given up to lucerne, the soil is porous, and thus permits the grazing of it without fear of injury by the feet of stock. Generally, the best results from lucerne are obtained where it is used as a soiling crop—that is, for cutting and carting out to stock, and for haymaking when the weather is suitable. No plant flourishes so well under a system of repeated cutting. At Ruakura Farm of Instruction plots of lucerne have given a return of over 10 tons to the acre at the one cutting, and as five cuttings can be obtained, the total yield in the season, it will be seen, is considerable.

The chief question to consider is whether lucerne should be regarded as a soiling or a grazing crop. Even from the days of the ancients—Virgil mentions it in his “Georgics”—lucerne has been grazed, and this is the common procedure in the Argentine; but this implies judicious management in such a climate as ours—in fact, with an abundant rainfall it would probably be found impracticable to graze lucerne, especially where the soil is of a wet and retentive nature. On land naturally well drained and generally affording a dry soil-surface, grazing is possible; but even here the full benefit of lucerne will not be secured if it is treated as a pasturage crop. Cattle can be grazed on lucerne with confidence, provided care is taken in the initial stage of feeding to guard against bloating. At the same time more feeding-material can be obtained from an acre by cutting and carting. Grazing by sheep has to be judiciously managed. When the plant is laden with moisture bloating is almost certain to occur, while the sheep must never be allowed to eat the plant down too close to the ground. It may not, for instance, take the place for lamb-fattening of rape, the best of all feeds for ensuring rapid



maturity, except in seasons of drought, when a considerable area would be invaluable for this purpose.

The best results, I am convinced, will be obtained where lucerne is used as a soiling crop, a portion being also made into hay. This is the experience in America, and with our moist climate the advantage of this method is decidedly emphasized.

To render lucerne more suitable for grazing, something might certainly be done to produce a variety by selection which would



FACE OF THE NINE-ACRE LUCERNE CROP AT RUAKURA, PHOTOGRAPHED LAST MONTH.

obviate the danger of destruction by too close grazing. The recumbent type grown to some extent, especially in Australia, could be improved, and thereby be made both a profitable species and one which would lessen the danger from grazing lucerne.

Used as a soiling crop, lucerne will not only provide more feed to the acre, and enable more stock to be maintained (I feel quite certain that three cows per acre can be carried on lucerne), but it will maintain the crop at a better standard, an invariable rule where no portion of a crop is wasted by reason of animals living on it. The dairy-farmer will certainly find it more profitable to cut and cart out his lucerne. He will then secure the full value of the crop, while the cows having the lucerne in addition to the ordinary grass

pasturage will obtain the benefit of a better-balanced ration. The lucerne should not be fed immediately after cutting, but should be allowed to wilt for a few hours. There will then not be the tendency to bloat, and the cattle prefer it in this condition.

It is generally better, whenever possible, to cut the lucerne when dry. For this work a cheap low wagon on light broad wheels, or a sledge, should be employed. The making of an implement which would cut the lucerne and automatically load it on the wagon or sledge might well receive the consideration of our implement-manufacturers. Such an apparatus would also be very handy where ensilage was being made. It would thus largely do away with the great drawback to silage-making—*i.e.*, the cost of stacking. The old-fashioned reaping-machine, which collected the material in loose sheaves on a board, would be better than anything we have at the present time. Given such a machine, which would reduce the cost of handling forage crops and making ensilage, the question of more intensive cultivation and more profitable milk-production would be largely solved.

Lucerne undoubtedly provides the best of all silage materials, but used by itself for this purpose it presents a certain disadvantage. As with all legumes, it has a particularly high flavour when made into ensilage. This may be overcome by mixing the lucerne with green grass or some non-leguminous fodder plant, such as maize or millet. It may indeed be mixed with a little old hay or straw, provided copious drenchings of water are supplied during the stacking process. Lucerne, under whichever form it is supplied, is the most highly concentrated fodder plant known. It contains within itself a ration of higher nutritive value than any other plant, and fed judiciously is capable of maintaining more stock to a given area than any other plant. Especially does this apply to milking-stock, for which it is invaluable for sustaining the milk-flow, and at the same time maintaining the animal in thriving condition. We have much to learn yet in regard to growing and feeding it to the best advantage; but this we do know—that it has brought fortune to many farmers in other lands, and promises to do the same in this country, provided it is studied and managed to advantage. As an American writer has put it, "It is one of Nature's choicest gifts to man." It must be remembered that lucerne not only keeps stock in fine condition, but it also makes the best of manure, which, when returned to the soil by stock, improves it cheaply and quickly, so that the farmer who grows lucerne is taking the most direct road to fortune.

Of all hay there is none to equal that made from lucerne. It is the most nutritive of all dried fodders. In this form it can be

fed to great advantage to any class of stock. In preparing the hay care must be taken to cut it at the right time—just at the beginning of the flowering stage. The process must not be unnecessarily delayed, as the plant dries rapidly as it loses its leaves. When slightly wilted the crop should be raked into windrows and cocked, and be allowed to cure in the cock. If possible, caps should be used on the cocks, to turn the rain and protect the material from the sun. Lucerne bears rain badly, and when exposed to hot sun it becomes discoloured, and the value of the leaf—the most nutritious part of the plant—is to a considerable extent lost. The hay may be stacked in a comparatively green stage by putting alternative layers of straw or old hay between it. This prevents overheating. The straw or old hay is not lost in the process, it is converted into better feeding-material, as it takes on some of the flavour of lucerne. Hay may be made from lucerne in an absolutely green unwilted state if stored in a properly constructed hay-shed, the bottom of which is sparred and elevated 2 ft. above the level of the ground, so as to allow of ventilation beneath. The shed should be large enough to store one cutting of lucerne, and only cover the bottom of the shed to a depth of 3 ft. to 4 ft. By the time the second cutting is ready the first will have dried in the shed and the second may be put on top, and so on with each cutting until the end of the season. Hay made in this fashion cuts out quite green, and commands a high price in the American markets. The lucerne must of course be free from dew or rain when stored. This is a system which I believe will be found very suitable for our New Zealand climate.

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Of the nine varieties of lucerne being treated at Ruakura Farm of Instruction—Hunter River, Colonial (Marlborough,) American, Peruvian Imported, Peruvian Acclimatized, Hungarian, Provence, Arabian, Siberian, and Turkestan—that promising the best results is Hunter River (New South Wales) and Colonial. The Peruvian Imported is affected with leaf-spot, a trouble entirely absent from the plants grown from the seed of this variety produced at Ruakura. Arabian is promising very well.

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On one of the most unpromising fields at the Ruakura Farm of Instruction there is a splendid crop of crimson clover—a dense growth—which followed a ploughed-in crop of beans. The field eighteen months ago was a poor burnt-out swamp, with patches devoid of soil, and with a large proportion resting on an iron pan. Thorough cultivation enabled a fair seed-bed to be secured, and the present fine condition of the crop well indicates what may be done with the most unpromising swamp land by thorough working, and the turning-in of green material for humus-creating purposes. An adjoining field of a similar nature, and reclaimed at the same time, is now carrying a very promising crop of peas and oats.



## CARE AND TREATMENT OF MILK.

W. M. SINGLETON.

At no period in the development of New Zealand dairying was good-flavoured milk more essential than at the present time. The keen competition in the Home market with the produce of other countries, together with the increasing fastidiousness of the British consumer, makes it more and more necessary for us to produce a finer-flavoured article each year. To produce the best flavour in either cheese or butter the quality of the milk is of the greatest importance, and therefore the supplier should thoroughly understand his part of true co-operation, which is necessary to attain this end.

### KINDS OF FLAVOUR.

In milk we find two classes of flavours—viz., food and contamination. Those flavours of different foods which the milk absorbs from the animal before being milked are known as “food” flavours, and are more pronounced at the time of milking. Contamination flavours are those which gain access to the milk after it leaves the udder of the cow. These are of two kinds: one is due to flavours of certain substances which are absorbed by the milk after milking, while the other is due to the milk being directly infected with bacteria, which also takes place at some time subsequent to milking.

### FOOD FLAVOURS.

Although food flavours as a rule cannot be entirely eliminated, still they can be minimized considerably by judicious feeding and proper treatment. Food flavours are primarily due to the presence of volatile oils contained in the strong-flavoured foods, and such flavours leave the animal through the different secretions of the body. When the feeding is done shortly after milking these food flavours largely pass off through the other secretions, and are not so noticeable in the milk as when the feeding is done shortly before milking. On the contrary, when the feeding is done at milking-time, or shortly before, the larger portion of these flavours are thrown off from the body by means of the milk. When it is absolutely necessary to use feeds which cause such disagreeable flavours the supplier could lessen the trouble very materially by feeding with discretion. This could be accomplished by giving more attention to time of feeding, and also by supplying the cows with

some rough forage along with the foods which cause the objectionable flavour.

#### CONTAMINATION FLAVOURS.

While food flavours are to a certain extent beyond the control of the supplier, contamination flavours are entirely within his control; but suppliers frequently attribute such flavours to the effects of feed in order to screen their lack of cleanliness. The principal troubles with flavours are with the class known as contamination, and are caused by bacterial infection. Those flavours due to the milk absorbing the flavours of certain strong substances to which it may be exposed are, as a rule, not so objectionable as those caused by the action of a living germ. In fact, the predominant defects in flavour are due to the action of bacteria which gain access to the milk through lack of cleanliness in connection with the milking, the utensils, and surroundings. The results of some experiments made during recent years indicate that some of the so-called food flavours are due to bacteria which gain access to the milk after leaving the cow.

#### THE TINWARE.

Poorly-made utensils are responsible for a considerable quantity of bad-flavoured milk. No rusty tinware should be used, and all corners should be flushed with solder. These corners often become propagators of filth-germs, and quickly seed that milk with which they come into contact. Dairy-utensils should have as few corners as possible, for it is the corners which make thorough cleaning difficult.

#### WASHING OF TINWARE.

The operation of washing the tinware is one which is neglected as much as any other one thing in connection with the care of milk. This is often left to the skill of the small boy who drives the milk-cart, and whose chief ambition is to get the stains or appearance of milk on the cans obliterated. In washing all utensils special attention should be given to the corners, and a brush should be used rather than a cloth. The contaminating influence of dirty cloths is obvious, and that these are too frequently used cannot be gainsaid. Sufficient attention is not given to this matter at the majority of factories. Too many cans, as a rule, are washed with the same water, and, although the first one or two washed may be treated properly, still it is very questionable if the latter cans are not actually worse after passing through such operation.

First use tepid water until the milk is cleaned from the tin, then wash with hot water and steam thoroughly. At the farm where steam is not available boiling water should be substituted. After all tinware has been thoroughly washed and scalded, set it in a clean place

for a sun-bath, because it must be remembered that sunlight is one of the best disinfectants. A cloth should never be used for drying tinware, as the steam or scalding water should produce sufficient heat for this purpose.

### THE COW-BYRE.

To guard against the invasion of the milk by filth-germs the condition of the cow-byre should receive close attention. The floors should be cleaned after each milking, and, to facilitate easy and thorough cleaning, concrete floors are preferable. These floors should be constructed so that it will be impossible for pools of liquid manure to remain in the stable. The building should also be well lighted, and supplied with good ventilation. The walls and roof should be kept clear of dust and cobwebs, and also be regularly limewashed, which will give a much purer atmosphere and tend to prevent the growth of mould.

### MILKING.

Many cows are milked when in an unsuitable condition. Milch-cows should always be kept clean, instead of being allowed, and often compelled, to tramp through slush, mud, and liquid manure. Bacteriologists have frequently traced trouble in connection with milk-suppliers to causes produced by these and similar conditions. This dirt often dries on the cows, and finds its way to the milk-pail in the form of dust. All dry particles should therefore be removed from any place likely to dislodge them into the milk-pail, and the udders and teats thoroughly cleaned with a damp cloth before milking. If the udders are dirty more thorough washing is necessary. The hands of the milkers should be washed before starting to milk each cow. For this purpose a drum can be easily arranged. To this should be fitted a tap, the waste from which should lead to the drain. The hands could then be washed by running water from the tap. This would prove much more sanitary and satisfactory than the use of the wash-basin with water which has already served the purpose too frequently.

It is necessary that every milker should be supplied with a suit of overalls for use at milking-time, and to have these cleaned regularly. Too many milkers wear their dirtiest clothes for this work, but milkers must keep their clothes clean in order to keep the milk pure.

The milking should be done with dry hands only, and the filthy practice of lubricating the hands with milk should under no circumstances be tolerated. A little vaseline is an advantage when cows are troubled with sore teats.

During the milking, and afterwards, the most scrupulous cleanliness is necessary to keep the milk in the best condition. To attain this object the milk must be removed immediately after milking to some



place where it will not be exposed to bad flavours. In selecting the place for the milk-stand the direction of the prevailing wind must be considered, and the stand placed on the windward side of the cow-byre or other contaminating influences. Besides being on the windward side it must necessarily be some distance away, in order that when the winds change, or on close muggy evenings, the milk may not become deteriorated in flavour. A suitable place can generally be found within 50 yards of the stable or milking-shed.

The milk-stand should in no case be under or in too close proximity to trees of any variety. Objectionable flavours in milk have been traced directly to this source of infection.

#### STRAINING.

Immediately after the removal of the milk from the cow-byre it should be carefully strained. Some suppliers are inclined to believe that the straining is a cure for all the dirt that gets into the milk, and are therefore less careful in the milking than is necessary. They evidently forget that much of the solid matter dissolves on entering the milk, and that the milk thereby becomes seeded with germs, which easily pass through the strainer and continue their work of deteriorating the flavour of the milk.

The strainer requires considerable attention, for unless washed and thoroughly scalded each day it is liable to become a source of contamination rather than a purifier. A fine-wire strainer is recommended.

An improved and efficient class of milk-strainer is that known as "U lax." The fine-wire mesh and cotton-wool disc are much more effective than the ordinary strainer. The cotton-wool disc is used only once, and is replaced by a new one at each milking. These are inexpensive and exceedingly thorough in their work.

#### APPARATUS FOR COOLING.

The following method is suggested where dairy-farmers have good well or spring water: Procure a 300- to 400-gallon tank; elevate same, and secure a good spiral coil circular cooler, a receiving-can and attachments, and it will be found that milk can easily be cooled to within two or three degrees of the temperature of the water.

#### COOLING.

Allowing milk to stand at high temperatures produces conditions eminently favourable for the growth of those germs which produce bad flavours in all dairy-products.

The most desirable temperature for the cooling of milk to be used for local consumption is from 50 deg. to 55 deg., and, although this is not always practicable, every endeavour should be made to lower the

temperature to as near this as possible. Some species of bacteria which produce bad flavours do not grow at these low temperatures, while those that do develop grow but slowly, and the development of the organisms which produce souring is almost entirely stopped. For manufacturing purposes, where a certain development of lactic acid is essential, a temperature of from 60° to 65° will give good results; but it is absolutely necessary to attain this temperature in order to sufficiently retard the development of the undesirable organisms. With a good cooler this will be found feasible with the average well-water of the Dominion, irrespective of climatic conditions.

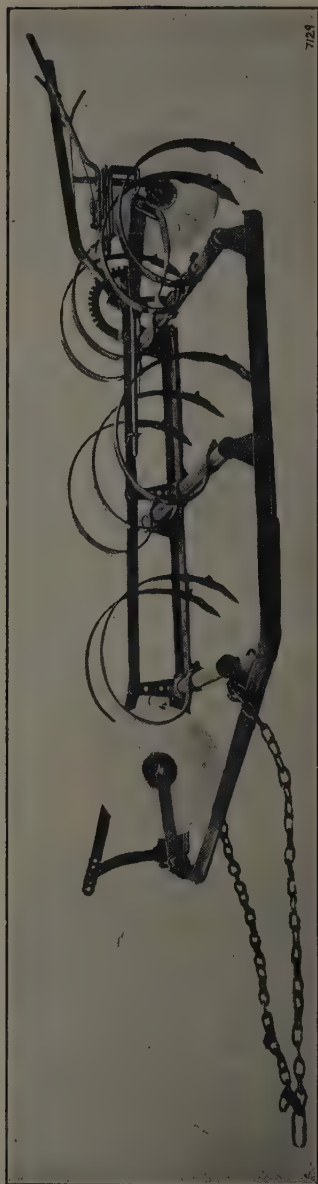
#### RETURNING BY-PRODUCTS.

The returning of the by-products in the milk-cans is a matter which often has a detrimental effect on the quality of the milk-supply. The suppliers should see that the skim-milk tanks are thoroughly cleaned each day, and, if not, no skim-milk should be allowed to go into the milk-cans; whey should never be returned in the cans under any circumstances. Not only does whey make the cans more difficult to clean, but the whey soon destroys the tin, and thereby destroys the can, as it is impossible to get cans properly cleaned when the tin is off and the iron getting rusty.

Progressive dairymen are beginning to recognize more and more the necessity of sterilizing skim-milk and whey before allowing it to form a part of the food-ration of young animals. The Danes have adopted precautionary measures in this direction, and have, by law, made the pasteurization of skim-milk compulsory. It is doubtless only a question of time when this system will be generally adopted.

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*Household Milk.*—To keep household milk in good condition it is essential that the vessel containing it should be thoroughly clean. After the vessel is well washed it should be thoroughly scalded with boiling water, being then allowed to dry by draining and exposure to the air in a clean atmosphere. A cloth, generally a contaminating medium, should not be used for drying purposes. Having received the milk, the vessel should be stood in cold water, which, in warm weather especially, should be occasionally changed in order to keep the temperature as low as possible. This is not so necessary when the milk is delivered, as it should be, in a cold condition. As one writer has well put it, "If your milkman delivers you warm milk, make it hot for him." The milk-vessel should be kept tightly closed to exclude the air. Where it is desired to pasteurize the milk the vessel containing it should be stood on a stove till the milk has reached a temperature of 180°, and should then be placed in cold water, repeatedly changed, till a low, and safe, temperature has been reached.



THE HARVEY PLOUGH.

## CULTIVATION OF THE ORCHARD.

### A USEFUL IMPLEMENT.

A. BAILEY MANSFIELD.

MUCH has been written on the advantages of liberally manuring the orchard with artificial fertilizers, but little is said of the advantages of thorough tillage. The benefit to be derived from thorough cultivation of the orchard is of direct importance to the commercial fruit-grower; it is of far greater value than the application of a stimulating fertilizer, the effect of which is only temporary. Many will declare that New Zealand soils are rich enough in plant-food and do not require working. This is fallacious. There is no comparison between fruit from a well-grown apple or pear tree and that from a garden sown down in grass. A tree cannot produce first-grade succulent fruit from a soil that is never worked, and has many calls on its fertility by perhaps crop or grass; neither can the soil receive from the atmosphere those elements so essential to nitrification if it has not been brought to a good state by tillage. Orchard cultivation does not finish with merely ploughing the "lands" between the trees, with perhaps a subsequent cross-ploughing or harrowing, leaving a portion around the tree not touched. If the fruitgrowers of New Zealand



THE HARVEY PATENT SHIFTING-HANDLE SIDE-DRAUGHT ORCHARD PLOUGH AT WORK.



desire to compete in the markets of the world they should be equipped with the most modern implements, those that are capable of performing the maximum of work with the least expenditure of labour, either manual or horse. In Victoria and Tasmania, which are the largest fruit-growing States in the Commonwealth, the practice is to plough up to the trees in the spring, and away from the trees the following year. The Harvey patent shifting-handle side-draught orchard plough, illustrated herewith, is universally used in Victoria and Tasmania. It is one of the best labour-savers the fruit-grower can possess. As the handles can be swung out and the line of draught altered, it is possible to plough right up against the butt or barrel of the trees without injury, the horse and driver walking well out in the centre of the "land." This dispenses altogether with hoeing or digging.

A well-kept orchard is to an extent far less liable to harbour injurious insect pests, while it enables the trees to better withstand any of the fungous diseases to which they are at all times liable.

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#### THE WERAROA HOLSTEINS.

At the Palmerston Show on the 1st November the annual draft of yearling bulls from the Weraroa Experimental Farm of the Department were sold by auction. The sale attracted widespread interest. The six bull calves realized an average of 175 guineas, the individual prices being: Dominion de Kol Domino, 290 gs. (record of dam—Domino III—21,784 lb. milk, 769-824 lb. butter-fat); Dominion Baron Frederick, 187 gs. (record of dam—Manola—20,402 lb. milk, 632-462 lb. butter-fat); Dominion Cozak, 151 gs. (record of dam—Lenore—10,597 lb. milk, 360-298 lb. butter-fat); Dominion Royalist, 151 gs. (record of dam—Lulu—15,114 lb. milk, 453-42 lb. butter-fat); Dominion Admiral, 136 gs. (record of dam—Freda—7,985 lb. milk, 279-475 lb. butter-fat); and Dominion Marco, 135 gs. (record of dam—Barbe—12,054 lb. milk, 354-882 lb. butter-fat). All these calves were by the old bull, Sir de Kol Inka Pietertje, imported by Mr. Newton King, of New Plymouth, and purchased by the Department when the Weraroa herd was established. Past his prime, and having to give place to a younger bull, the old sire was passed under the hammer and sold at 60 gs. A three-year-old Longbeach bull realized 90 gs. and an imported bull, calved last March, went at 80 gs. Three heifers realized respectively 111 gs., 101 gs., and 92 gs., and a cow 90 gs. Two non-registered milking Shorthorn yearling bulls were sold at 35 gs. and 34 gs., and a twenty-months old Jersey bull, of New South Wales breeding, at 27 gs. The sixteen head brought a total value of £1,858, an average of £116 2s. 6d.

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The signs of a good cow, according to an American writer, are: (1) An owner with a kind and sympathetic heart for a cow—a born love for the animals; (2) COMFORT, spelled with capital letters at every turn; (3) a silo; (4) plenty of good feed; (5) giving the cow the right kind of a father; (6) testing her, and keeping a record.

## LUCERNE AT RUAKURA.

## SUCCESS ATTAINED ON UNPROMISING MEDIUM.

THE photographic reproduction on page 488 illustrates the possibilities of lucerne in soils which might naturally be expected to provide a poor medium for its cultivation. The land was a poor kahikatea swamp, reclaimed a few years ago, and was one of the most unpromising pieces of land on the Ruakura Farm of Instruction. There is at present a very thin top layer of soil, which varies from sand to heavy loam, and over the greater part this rests on a stiff clay subsoil of considerable depth. The lucerne was planted in the 9-acre field on the 3rd November of last year. The land received thorough preparatory cultivation. Prior to sowing the seed there was applied a manurial dressing comprising liberal quantities of Malden Island guano, sulphate of potash, and basic slag. This artificial stimulation was given more by reason of the poor nature of the soil than because of its being considered necessary to lucerne under ordinary conditions. With the seed—16 lb. of Hunter River variety to the acre—2 cwt. of basic superphosphate was mixed. The principal portion of the field received lime and inoculation—18 cwt. of ground unburnt lime to the acre and 2 cwt. of inoculated soil to the acre. Last year the crop was cut four times, the first cutting being left on the ground as a mulch. At the date the accompanying photograph was taken, the 25th of last month, the crop was fully 3 ft. in height, of a healthy dense growth all over the 9 acres, with the exception of the uninoculated strip, where the lucerne was struggling vainly against weeds for possession of the soil. The crop is undoubtedly a very fine one, and a striking proof that lucerne can be grown with success on intractable soil, provided it has the advantage of a thoroughly good seed-bed and the desired conditions, of which lime and inoculation are paramount.

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WHITE-CLOVER SEED.

THERE is every indication that the price of white-clover seed will be extremely high during the coming sowing season. Farmers who will be using this seed are advised to make their purchases as early as possible, not only for economy's sake but in order to secure the better class of seed on the market. If the season proves suitable for sowing, such a demand for white-clover seed will be created that the price must considerably advance, while the standard of the seed finally available will be undesirable. If samples are obtained now there will be ample time to have these tested as to their purity and their germination capacity.

## HERD-TESTING.

### GLEANINGS FROM LAST SEASON'S WORK.

W. M. SINGLETON.

MANY items of interest regarding illustration cow-testing work being conducted by the Dairy-produce Division of the Department have been placed before the dairymen of New Zealand; but at the close of the third season's work there are lessons to convey that could not have been provided hitherto, while solid progress can be reported.

During the past season there were some 5,400 cows under test in the five associations being controlled by the Division. Three of these associations had been under the Department's auspices during the 1910-11 season, and for the 1912-13 season they are being continued as independent, self-supporting associations.

#### INCREASED PRODUCTION OF AVERAGE COWS.

The three associations under the departmental control during the two seasons evidence an increased yield during the second season, as regards the average cow, that is certainly very creditable. It is not suggested that there were no factors contributing to this other than the testing, but I do believe that testing must be credited with the major portion of the increase. During the season 1910-11 the average production of the average cow of each of these associations was 219.74 lb. fat. During the season 1911-12 it was 236.40 lb. fat, an increase of 16.66 lb. fat per cow, or over 7 per cent. The value of this increase in one year, with butter-fat at only 1s. per pound, is equal to over £3,100 for the three associations.

With the present number of cows producing milk to be manufactured into butter and cheese for export, an increase of 7 per cent. in yield would amount to over £267,000. Surely this is worth attempting.

#### ONE ASSOCIATION'S INCREASE.

One of these three associations increased the production of its average cow from 218.77 lb. fat for the season 1910-11 to 241.56 lb. fat for the season 1911-12. This is equal to 22.79 lb. fat per cow. In this association there were nineteen members who were in during the whole of both seasons, and without exception their herds evidenced an increased production per average cow. This is a great

record, and not every association can hope to equal it. Neither could such a record be expected were all the suppliers to a factory to join such an association. Not but that such should be the case, but it is well known that the associations number amongst their members, with few exceptions, the most progressive dairymen of their districts. The factory supporting this association handles, at the height of the season, the milk of some 6,786 cows. The increased yield of the 583 association cows, at 22.79 lb. fat per cow, amounts to 13,286.57 lb. fat, worth, at 1s. per pound, £664 6s. 6d. Had this same increase obtained throughout all the herds supplying this factory, the extra butter-fat supplied would have amounted to 154,653 lb., worth, at 1s. per pound, £7,732 13s. This amount would make a pretty handsome bonus for a factory of this size to pay its suppliers. The increased yield of the average cow of this association amounts to over 10 per cent. of her yield for the season 1910-11. This is a higher percentage than obtains with any of the other associations, and is probably accounted for by the fact that during the second year this association was almost entirely supported by first-year members, who had culled effectively by intelligently using their testing-records.

#### INCREASED YIELDS IN INDIVIDUAL HERDS.

The whole is only equal to the sum of its component parts, and while the increased production of the average cow in the three associations is creditable, it has been shown that one association has far surpassed that average. In the same way some individual herds in the associations far outclass the average increase shown by the best association's increased yield for the second season.

In a review such as this it is impossible to refer to all the creditable increases that are evidenced by the figures. Only a few will receive attention.

*Case A.*—The owner had a herd of forty cows. The yield of the average cow in the herd was as follows: Season 1911-12—Fat, 309.31 lb. For the season 1910-11 the fat was 219.89 lb. The increased yield for the second season was 89.42 lb. for the average cow. The increase for forty cows is equal to 3,576.8 lb. fat, or, at 1s. per pound, £178 16s. 9d. There was in this herd during the first season a number of two-year-old heifers which were retained for the second season as three-year-olds. A portion of the increase credited to the average cow of the herd for the season is due to this natural increase; but not one-third of the season's increase can be accounted for in this way. Intelligent culling on the basis of records at the end of the first season's testing must be credited



with a good deal of the average cow's increased yield during the second season.

*Case B.*—During the season 1911-12 the owner milked forty cows, which averaged 8,040 lb. of milk and 318 lb. of fat. During the season 1910-11 he milked sixty-seven cows, which averaged 5,808 lb. milk, containing 230 lb. fat. The increase during the second year was 2,232 lb. milk, containing 88 lb. fat. Sixty-seven cows during the first season produced 15,410 lb. fat, and forty cows during the second season produced 12,720 lb. fat. For the trouble and expense attendant on keeping and milking the twenty-seven extra cows the owner received the difference between 15,410 lb. and 12,720 lb. fat, which equals 2,690 lb., or not quite 100 lb. fat per cow. These twenty-seven cows certainly gave a larger yield than the 100 lb. fat, but owing to their being on the place the remaining forty cows did not do so well. There are many instances in which the herd could be cut down by culling out the most inferior producers without decreasing the net revenue.



This cow gave 12,398 lb. of milk and 427.15 lb. of fat in 266 days.

This splendid increase of some 88 lb. fat per cow was accomplished almost entirely by intelligent culling. Even during the first season the yield of the owner's average cow was above that of the average cow of any of the cow-testing associations commencing that year. The owner had weighed the milk of his cows at regular intervals

before his cow-testing association came into operation. His action in culling heavily evidences the fact that he believes in using the pounds of fat rather than the pounds of milk as the determining factor.

This dairyman has a registered pure-bred dairy bull, and from some of his best cows hopes to augment his herd with heifers which



This cow gave 2,895 lb. of milk and 115 lb. of fat in 111 days.

will ultimately increase the already splendid average yield. He has to add only nine cows equal to the average of his forty in order to yield a greater total of butter-fat than his farm produced during the first season, when sixty-seven cows were milked. It would require at least one milker more to milk sixty-seven cows than forty-nine, by hand. There is also a saving in other contingent expenses.

*Case C.*—In the season 1910–11 the owner had ninety-eight cows, with an average production of 256.73 lb. of butter-fat. On his joining his association for the season 1911–12 it was ascertained that he had culled fourteen cows. The average production of these culled cows during 1910–11 was 4,705 lb. of milk, containing 169.74 lb. of butter-fat. For the season 1911–12, by means of this culling and replacing by other cows, the herd average for ninety-four was raised to 7,648 lb. of milk, containing 308.14 lb. of butter-fat, repre-

senting an increase of 51.41 lb. per cow. For the herd of ninety-four cows this increase would equal 4,832.54 lb. This owner received 15.35d. per pound for his fat last season, so that the increase was worth to him at this rate £309 1s. 7d.

The keeping of records for indicating the yield of dairy cows is no fad: it is merely putting the farm end of dairying on a business basis. Each cow is a department, and the financial statement must show that each department pays if it is to be retained. Dairymen not having their cows tested cannot use the best judgment in grading a herd up to an increased average yearly production.

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## THE BUTTER INDUSTRY IN SIBERIA.

Translated by J. PEDERSEN.

THE German Agricultural Adviser, Dr. Hollman, who is stationed in Russia, has the following to say in the "Mittheilungen der Deutschen Landwerthschafts" about the butter industry in Siberia:—

"In 1911 there were 1,235 co-operative dairy factories in West Siberia, 700 of these being in the province of Tobolsk, and the remainder in Tomsk.

"The Siberian dairy cow is a small but hardy animal. It is kept outside the whole year round, even in the winter, when the temperature often goes below zero. Hardly any shelter is provided, and the cows are fed with only a little hay and straw. In a snow-storm they look after themselves as best they can. Naturally the yield is small, and in the winter there is none at all. The average yield is about 500 kilos (100 gallons), the average fat-content of which is somewhat high—viz., 5.0 per cent.

"Before the Siberian railway was opened very little butter was made. The production was on very primitive lines, and the butter was simply melted and poured into jars. The dairy business was then mostly conducted by foreigners, and at the commencement they had great difficulty in buying the milk from the farmers. These latter are, as a rule, very superstitious and ignorant, and they considered it a sin to sell the milk to a dairy-factory, and the separator was often blamed for any mishap to a supplier.

"The Siberian dairy factories are even now very primitive, and only a few of them could be favourably compared with the

German factories. Out of 1,060 factories only sixty of them are using steam as a motive-power, the great majority still using the old horse-power to drive the separator and churn. In most places the sanitary arrangements are very bad, some of the factories having hardly any water-supply. Out of the 1,060 factories only fifty-three have concrete floors, 743 have wooden floors, and the remainder have a mixture of earth.

"As Siberia is very thinly populated, the cream is collected from skimming-stations, and also from the farmers. The greatest drawback however, to the development of the butter industry on proper lines has been the gross ignorance on the part of the farmers, and even amongst the factory-managers, 64 per cent. of whom have had no training—they are self-taught.

"It is often due to the lack of experience on the part of the managers that the Siberian butter is of poor quality. Most of these men can hardly write their own names, and therefore the calculation of each supplier's milk is often a source of great trouble.

"When a factory is started the Government advances 3,000 rubles (£300) plus 25 rubles for each supplier. Four-per-cent. interest is charged, and the loan must be paid off within five years.

"The managers of the large factories are paid 400 rubles (£40) per year plus a bonus. Most of the factories run only from May to October, and are closed during the winter. The milk-supply could be increased enormously if the farmers would only look after the cows during the winter months, house them, and feed them properly. But as dairying requires perhaps more intelligence than any other branch of agriculture, it will take years, if not generations, before Siberia will be on a par with Western Europe.

"The export of butter from Siberia in 1906 was 49,000,000 kilo; in 1907, 58,000,000; in 1908, 56,000,000; in 1909, 57,000,000; and in 1910, 64,000,000. In 1910 about half the export went to England, one-third to Germany, and one-sixth to Denmark, from whence it was again exported. Last year 181 dairy factories in Western Siberia formed an association, with head offices in Kurgan and Berlin, Germany. The association has been formed with a view to improving the quality of the butter in Western Siberia. The butter from this association is graded and paid for according to quality."

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In the Jersey butter test at Guildford, Lord Rothschild's Twylish 11th was easily first. She was 103 days in milk, gave 69 lb. of milk, 40 lb. of which was at the morning milking. The butter-yield was 3 lb. 5½ oz.



## WRAPPING-PAPER AND MOULDY BUTTER.

B. C. ASTON, F.I.C., F.C.S.

THE moulding of butters packed in certain papers is not unknown in New Zealand. The following details of a research carried out by Messrs. Burr, Wolff, and Berberich (L. Unters. Nahr.-u. Genussm., 1912, 24, 197-227, Abst. in J.S.C.I., Sept., 1912) may not be without interest to those engaged in an important industry.

The authors have collected from various sources and examined fifty-eight samples of parchment papers used for wrapping butter. Such papers are usually treated with a hygroscopic agent to keep them in a pliable condition, and in the majority of cases starch glucose syrup, or invert sugar, is the material employed. Glycerine is also suitable but more costly, whilst calcium or magnesium chloride is used in rare cases; the latter, however, imparts a bitter taste. In the samples analysed the moisture ranged from 5.5 to 13.1 per cent., the ash from 0.23 to 17.1 per cent., the aqueous extract from 0.005 to 31.1 per cent., and the sugar (direct reduction) from 0 to 25.78 per cent. The highest soluble mineral matter was 2.1 per cent., this value being generally below 1 per cent. Nearly half the samples contained over 10 per cent. of sugar, but sixteen of the fifty-eight were free from sugar. Biological experiments showed that the presence of sugar in the paper undoubtedly favoured the growth of mould in the butter wrapped in it, as also did glycerine, but in a minor degree. Butter salted with 2 per cent. of salt was sufficiently preserved against mould, provided it was sound and the percentage of buttermilk not excessive. Roughness of the surface of the paper tends to collect mould spores, and the presence of more than traces of iron and lead is objectionable. Moist butter, butter from which the moisture exudes in drops, butter not properly freed from buttermilk, all tend to become mouldy; the moisture exuded at the surface dissolves the sugar in the paper, forming a nutrient medium. If the paper be firmly pressed in contact with the butter, air is excluded and mould is less likely to develop. Washing the paper with hot water, then steeping in cold brine, is the best preventive against mould. If it be admitted that sugar should be used at all, the authors consider that a maximum limit of 10 per cent. of aqueous extract or 8 per cent. of reducing-sugar should be fixed. The best Swedish butter-papers are stated to be free from sugar.

In one case which was investigated in the Department's laboratory there was no essential difference in the sugar-content of two papers, one of which had moulded in contact with the butter, while the other, from the same factory, had developed no moulds. Assuming that there was no difference in the chemical composition of the two papers or of the butters wrapped in them, there is still the possibility that one paper had been manufactured or stored under circumstances which allowed the contamination of it by mould-spores, which did not, however, develop until conditions favourable to their growth—*e.g.*, moistening of the paper by the butter, &c., were present.

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### NEW ZEALAND GRASS-GRUB.

DURING this month the majority of the flights of the New Zealand grass-grub beetles will occur. It is necessary to a solution of the problem of dealing with this pest that the fullest details as to its life-history should be known. The Biologist of the Department, Mr. A. H. Cockayne, is therefore anxious to obtain information as to the exact dates on which the beetles are observed on the wing in different districts. From present indications it is expected that in the Wellington district the first flights will occur about the third week in November. Farmers throughout the Dominion would render good service in forwarding at once to the Biologist any observations they may make in the above connection.

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### BRITISH HOP-MARKET.

THE High Commissioner reports, under date of London, 11th September, as follows:—

Since reporting to you on the 9th August concerning the hop crop in this country the weather in the districts where hops are specially cultivated has continued unsettled and cold. The excessive rainfall which has been experienced has, however, lessened during the past month, and although the weather has not been fine and warm, it has been such as to enable the hops to develop and ripen satisfactorily. The crop therefore, while not being a heavy one, is of average quantity and quality. Picking is general, and some samples have been placed on the market. Prices are steady, but at present there is the usual fight going on between buyers and sellers for the establishment of values. Quotations rule from £5 10s. to £7 10s. per cwt., according to quality and description. I am of opinion, however, that the sellers will be able to command the market. Buyers have no stocks on hand, the high prices ruling last year having prevented their laying in any reserve, and they will naturally have to pay a fair price for any lots they may require, especially as the finest quality will be only in moderate supply. The probability is, therefore, that the market will remain firm, with a possibility of an advance in values, and if the sending of shipments from the Dominion is contemplated the prospect of a demand for New-Zealand-grown hops should be encouraging.

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Lady Ida (a half-sister of Grannie's Girl), a member of the Ruakura herd, gave 417 lb. of fat last season. She is in calf to the young bull at the head of the herd, a son of Campanile's Sultan and Grannie's Girl.

## COOL STORAGE OF FRUIT.

### PLANS AND SPECIFICATION OF A STORE FOR FOUR THOUSAND CASES.

T. W. KIRK, F.L.S.

THE rapid growth and extension of the orchards of the Dominion (the total area being 35,967 acres, an increase of 7,413 acres in four years), and the consequent ever-increasing output, has caused attention to be directed to the necessity for cool storage at or near the orchard as well as in the centres of population.

The attached plans provide for a building which will store 4,000 cases. Both plans and specification have been supplied by Mr. R. B. Grange, Consulting Engineer, Wellington, who states,—

“The machinery I am recommending will be capable of handling this quantity of fruit when the plant is running eight hours per day. It will be quite obvious to you that a smaller plant would do this work by running longer hours; but as the first cost of the plant is very little greater, the money saved by the shorter hours of running would more than compensate for the difference between the smaller plant and the one specified for, in all probability, in one year's work. Thus, by having this plant, capable of handling the work in eight hours, you will see that by working longer hours you can increase the quantity of fruit to be handled, and the only thing necessary would be the enlarging of your storage space. By running the full twenty-four hours this plant would be capable of handling 12,000 cases.

“I have also kept steadily in view that, at all times, with refrigerating-buildings it is best to put in nothing but the best of material and insulation. The cost of this building could be reduced considerably by putting in cheaper material and cutting out items you may think superfluous. The cost of the buildings complete, with the machinery as specified, is estimated to cost £1,700, my calculations being based upon the price of material either in Wellington, Nelson, or Hastings districts.”

Following is the specification for a cool-store to hold 4,000 cases of fruit the working-plans of which is appended:—

*Excavation.*—Level the site and remove all vegetable matter, and excavate for piles, foundation, and machinery-foundations to the various widths and depths shown (deeper if necessary).

*Filling.*—Fill in with hard dry material under concrete floors, all well rammed and consolidated.

*Concrete* in floors and wall-foundations to be composed of four parts clean shingle or broken stone and clean sharp sand mixed with one part of Portland cement. Stones in wall-foundation to be not larger than will pass through a 2-in.-diameter ring, with the smaller stones left in, mixed with sufficient sand to completely fill the voids between stones. Shingle in floors to pass through a 1-in.-diameter ring. All concrete to be measured in proper gauge-boxes and thoroughly mixed on mixing-boards, turned twice dry and twice wet, sufficient clear fresh water being sprinkled through a rose during the operation.

*Damp-course.*—Lay two-ply malthoid damp-course on all concrete foundations. Laps and joints to be well cemented with malthoid cementing-composition.

*Plastering.*—Render outside of concrete foundations where exposed to view, and concrete floors, with cement mortar,  $\frac{3}{4}$  in. thick, composed of two parts sand and one part cement. Plastering of cement floors to proceed simultaneously with the laying of the concrete.

*Surface Drain.*—Form small surface drain in grading-space, laid to proper fall, and rendered with cement mortar finished perfectly smooth.

#### CARPENTER AND JOINER.

All carpenters' and joiners' work to be of the very highest class, performed in a thoroughly workmanlike manner, and is to include all necessary mortising, tenoning, halving, pinning, furring, scarfing, housing, &c., as is usual in the best class of construction. All timber to be of the best description of the various kinds and grades specified, free from cracks, shakes, large or loose knots, to be sawn or hewn die-square, and to hold the full scantlings specified and figured when finished.

*Dry Timber.*—All timber used for insulation and flooring purposes to be thoroughly dry, and must be well cramped up previous to nailing.

*Clean up Floors.*—All floors at completion to have nails punched, and to be cleaned up and planed perfectly smooth.

*Insulation of Floors.*—Ground-floor joists to be 4 in. by 2 in., at 18 in. centre to centre, laid transversely to 10 in. by 2 in. bearer joists at 33 in. centre to centre, all heart totara or jarrah; all lap- or butt-jointed over bearers, and well spiked to same at all bearings, and straight-edged on top to receive flooring. Fit in between bearer joists 6 in. by 1 $\frac{1}{2}$  in. T. and G. jarrah or heart totara well nailed to joists and to 2 in. by 1 in. jarrah battens nailed to same, and cover with 1-ply malthoid carried at least 2 in. up each joist and secured with 1 $\frac{1}{2}$  in. by 1 $\frac{1}{2}$  in. jarrah angle-fillets well nailed to joists. All joints in malthoid to be well cemented and tacked at 2 $\frac{1}{2}$  in. centres.

*Pumice.*—Fill in, and well ram level with top of 6 in. by 2 in. joists, Firth's calcined sterilized pumice, and lay 6 in. by 1 in. T. and G. heart totara or matai floor over same, well cramped and double-nailed at all bearings. All nail-holes in butt joints to be bored. Over this floor lay 1-ply malthoid properly cemented and tacked at 2 $\frac{1}{2}$  in. centres, and another thickness of 6 in. by 1 in. T. and G. heart matai flooring.

*Insulation of Walls.*—Insulated walls to have two 4 in. by 2 in. heart rimu studs staggered at 18 in. centres, covered with 1-ply malthoid tacked to 2 in. by 1 in. fillets cut into studs; fillets to be spaced to suit malthoid, securely tacked and cemented at all laps and joints. Laps to be not less than 2 in., tacked 2 $\frac{1}{2}$  in. apart and cemented with proper cementing-compound, and then covered with 6 in. by 1 in. T. and G. lining, close-cramped and double-nailed at each bearing. All inside lining to be heart totara, outside lining heart rimu. Insulated partitions between cool-stores and battery-room to have 5 in. by 3 in. bottom plates, 5 in. by 2 in. top plates, 5 in. by 2 in. studs at 18 in. centre to centre covered with 1-ply malthoid, fillets, linings, &c., as above. The outside of external, insulated, and other walls to have 3 in. by 2 in. battens secured to lining or studs and spaced to suit iron. The whole of the spaces formed between linings to be filled with Firth's calcined pumice well rammed and tamped.

*Ceilings.*—The ceiling-joists to be 12 in. by 2 $\frac{1}{2}$  in. jarrah or heart rimu spaced 18 in. centre to centre, lined on both sides with malthoid laid transversely on fillets and 6 in.



by 1 in. T. and G. heart rimu as specified for walls. Spaces between ceiling-joists to be filled with pumice flush with top as before specified.

*Air-trunks* to be formed as shown with 1½ in. T. and G. heart totara boarding supported by 3 in. by 3 in. angle-fillets. Trunks to have eight openings fitted with eight ledged slides to each room, with 12 in. by 12 in. openings. Slides to have 2 in. by 2 in. rebated guides.

*Battery-room.*—The walls and ceiling of battery-room to be constructed as before specified. Floor to be made to slope and to be covered with 6 in. by 1 in. sawn heart totara, kauri, or jarrah, covered with ¾ in. Neuchatel asphalt laid on hessian or other suitable material. Asphalt to be carried 4 in. up walls. Inside walls of battery-room to be covered over lining with 1-ply malthoid securely tacked, cemented, and then painted with one coat of P. and B. paint. Trim for and form small door in fan partition, hung on T hinges and suitable fasteners.

*Insulated Doors.*—Insulated wall adjacent to grading-space to be trimmed as shown on plans for door-openings, and then fitted with 8-in.-thick Oregon insulated doors hung and framed as shown, covered with 1-ply malthoid and stuffed with clean washed wool or cow-hair. Doors to overlap openings at least 4 in. Margins of openings to be fitted with 4 in. by 2 in. totara frames, packed between lining with malthoid, well painted. Frames to be trenched to take 1½ in. greasy-hemp packing, as shown on detail. Doors to be fitted with sliding gear and fasteners as per detail.

Wedge doors between cool-stores and wedge door to fan to be trimmed as shown for door-openings and then fitted with Oregon insulated wedge doors, made tight with ½ in.-thick saddlers' felt as shown on detail.

*Schedule of Timbers.*—Roof: Tie-beams, 12 in. by 5 in. Oregon or heart rimu; rafters, 7 in. by 5 in. Oregon or heart rimu; struts, 5 in. by 5 in. by 5 in. by 4 in. Oregon or heart rimu; purlins, 6 in. by 2 in. Oregon or heart rimu; fascia and barge boards, 8 in. by 1½ in. heart totara; angle-stops, facings, &c., 6 in. by 1 in. heart totara, properly flashed. Roof to be covered with sawn rimu, built jointed over purlins, 8 in. by 1 in. O.B. Plates supporting principals, 6 in. by 4 in. heart rimu. Ports under principals as shown, 5 in. by 5 in. heart rimu. Sleepers, 6 in. by 4 in. jarrah or heart totara. Piles, 9 in. by 9 in. jarrah or heart totara. Partition between engine-room and grading-space: Studs, 5 in. by 2 in. heart rimu; bottom plate, 5 in. by 3 in. heart rimu; top plate, 5 in. by 2 in. heart rimu. Trimmers 1 in. thicker than ordinary timbers.

*Ceiling of Engine-room* to have 4 in. by 2 in. ceiling-joists and hangers notched over fillets fixed to tie-beams and covered on underside with 6 in. by ¾ in. T. and G. and V-jointed rimu lining. Line walls of engine-room and grading-space with lining as above, fixed vertically to 2 in. by 1 in. battens let into studs.

*Doors* to be 2-in.-thick framed and ledged doors as shown on plans, hung to 2 in. casings with three 5 in. cast butt hinges, with 8 in. rim lock and brass furniture complete.

*Sliding-door* to be framed, ledged, and braced, not less than 2½ in. thick, and covered with 4 in. by 1 in. T. and G. lining; to have proper smith-made fasteners and padlocks. Door to have 3 in. by ½ in. wrought-iron runner securely bolted to wall, and "anti-friction" hangers of 2½ in. by ¾ in. wrought iron, with 6 in. cast-iron rollers. Bottom of door to be fitted with 4 in. by ½ in. wrought-iron plate, full width of door, secured to door with stout screws, running between guides in floor, of two lengths 2 in. by ½ in. angle-iron made flush with floor on top.

*Felt.*—Sarking to be covered with best-quality red-edged roofing-felt, well lapped and properly pulled and tacked.

*Windows* to be of the dimensions shown. Frames 1 in. thick, with all necessary and proper fillets, 1½ in. pulley-styles, parting-beads, stops, slips, and pocket-pieces, 3 in. double-sunk throated and weathered sills, and 2½ in. brass-faced axle-pulleys. Sashes 2 in. thick, ovolo-moulded, double-hung with best-quality sash-cord and iron weights, and solid brass sash-fasteners. Sashes and frames properly fitted, tenoned, and pinned together. Two brass rings to lower and brass ring to upper sash: 1½ in. rounded window-boards with scotia under same. Sashes to be divided as shown with 1 in. astragals. Windows to be properly flashed and made tight at completion. Architraves to be 6 in. by 1 in., plain and stop-chamfered.

*Verandah.*—Construct verandah-roof, &c., in heart totara of the dimensions, &c., shown on plan.

## PLUMBER.

*Roofing-iron* and iron on all external walls to be 26-gauge galvanized corrugated of approved brand, properly flashed at points necessary, and secured to battens or purlins with  $2\frac{1}{2}$  in. lead-headed nails.

*Hips and Ridges* to be 18 in. 24-gauge galvanized iron, lead-edged, dressed into corrugations and properly secured. All laps not less than 6 in.

*Shoulder-caps* to be dressed with 5 lb. lead, to be carried well along ridges and down hips.

*Spouting* to be 5 in. ogee galvanized, 24 gauge, fixed on proper galvanized-iron brackets placed 36 in. apart.

*Downspouts.*—Fix four stacks of 3-in.-bore 24-gauge galvanized-iron downspouts from eaves to ground, and make all joints watertight.

## PAINTING.

The inside and exposed outside walls and ceiling of storage-rooms to be primed and painted one coat best white-zinc in oil, and finished with one coat of Velure paint. All match-lining doors and inside joinery work, &c., to be similarly painted.

All wood and iron work usually painted, or where exposed to view or weather, to be carefully prepared, cleaned, stopped, and primed, and then to receive two good coats of lead in oil (approved brand and tints).

*Glazing.*—All glass to be carefully bedded in putty, bradded, and back-puttied, and left without crack or flaw of any kind. All sashes to be glazed with 16 oz. sheet glass.

## SPECIFICATION FOR MACHINERY TO HANDLE 4,000 (BUSHEL) CASES OF FRUIT PER DAY.

The following machinery will be required :—

*One 3-ton Belt-driven Refrigerator*, with its ammonia condenser with water-sprinkler, stanchions, suction and delivery valves, &c., oil-traps for intercepting impurities; ammonia-receiver; high- and low-pressure gauges, with frames; and all the necessary valves, unions, &c., for the compression side of the plant complete. Also—

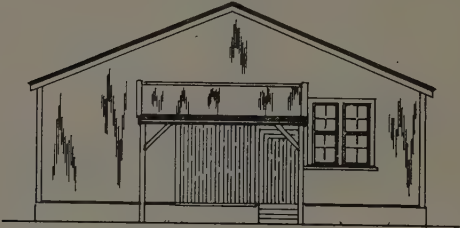
*One Battery Coil*, containing 660 ft. of  $1\frac{1}{2}$  in. special ammonia-pipe welded up into an oval coil for an air-battery, with its fan, pulleys, belting, &c. Also—

*One 9 B.H.P. Oil-engine* complete, with its water-circulating tanks, &c. The whole to be erected with foundations, &c.

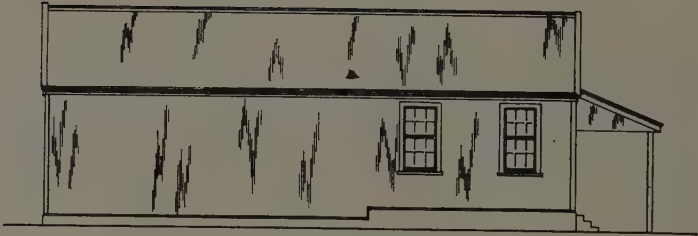
## VANCOUVER FRUIT-MARKET.

Writing under date of 1st October, the New Zealand agent at Vancouver reports,—

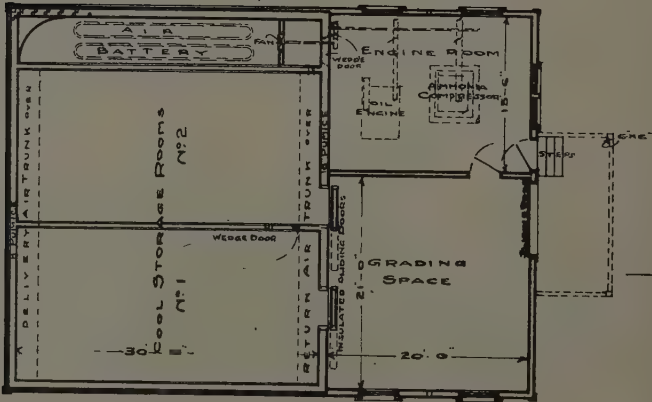
*Apples.*—The Okanagan Fruit Union have shipped several cars of McIntosh Reds, Gravensteins, and Wealthys to this market. The quality was very good, but the prices asked by shippers in the Okanagan are somewhat higher than the same class of fruit can be brought in from the American side, notwithstanding the duty on American fruit of 15 cents per box. There are large quantities of local apples available, but they do not appear to be of the quality of the Okanagan fruit or American fruit, hence the locals are being used more for cooking. The question of packing is one that affects the price, as consumers are demanding the best.



— END ELEVATION —



— SIDE ELEVATION —

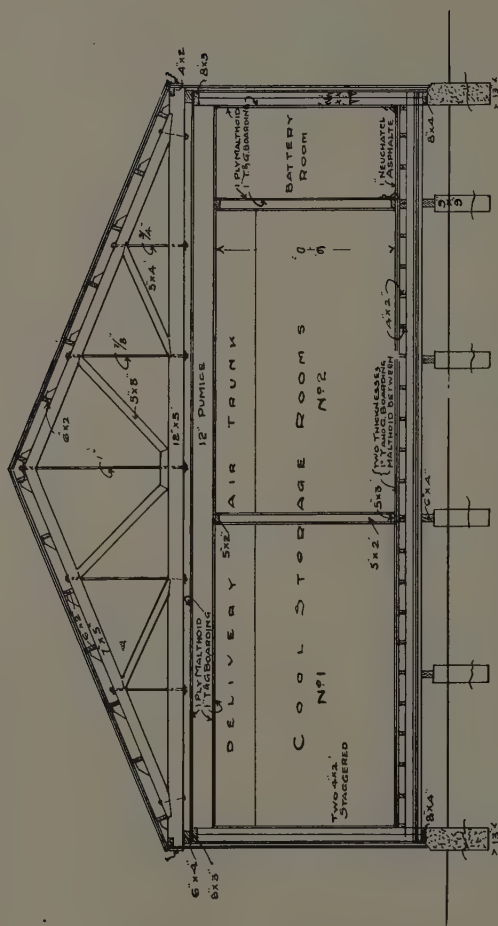


— PLAN —

Scale:  $\frac{1}{16}$  in. = 1 ft.

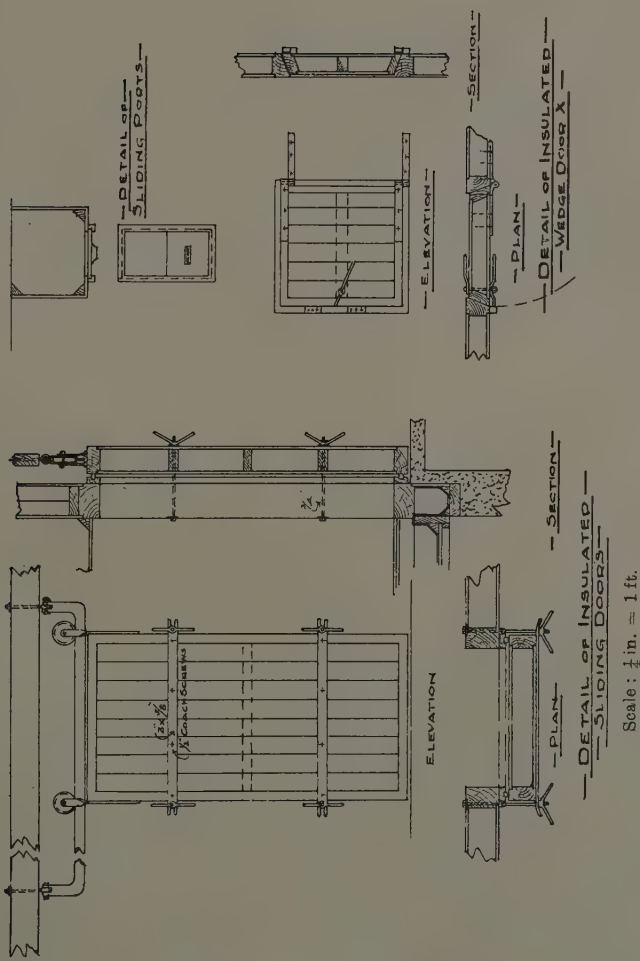






—CROSS SECTION A-A.—

Scale:  $\frac{1}{8}$  in. = 1 ft.



## THE HEMP INDUSTRY.

W. H. FERRIS.

THE quality of the fibre reaching the grading-stores is not up to the usual standard, owing to the heavy rains detrimentally affecting the fibre in the field, combined, in the Manawatu district particularly, with the leaf being disease-affected. Some of the leading brands are only reaching a fair grade, owing to the consequent weakness in both colour and strength. Scutching is still being slummed in many cases. A line, however good the colour and strength, cannot be classed above fair if the centres and tails are improperly scutched. Too little importance in general is attached to this detail.

### STRIPPER-SLIPS.

In several instances special labour-saving machinery is being installed to deal with this by-product. The appliance, a canvas elevator provided with spikes, catches the slips as they pass down the drain, and carries them on to a pole, a strong force of water playing on the slips as they are being elevated, thus washing them free of extraneous matter. Very good results are being secured.

### A GOOD COMPETITION.

At the recent Manawatu and West Coast Agricultural and Pastoral Association's show a competition was provided for the best bale of dressed phormium-fibre. There were four competitors. All the fibre was of excellent quality, and provided a good demonstration of what can be done when special care is taken in stripping and dressing. The first-prize bale (dressed by R. Webb, of the A. and L. Seifert Company) was awarded ninety-nine points, one point being deducted on the scutching. Under the present process the other details were as perfect as could be obtained. The second-prize bale was prepared by R. Stewart, of the G. Seifert Mill. This was scored ninety-seven points, single points being deducted under the headings of scutching, colour, and strength. Maddern Bros., of Christchurch, gained the third award with a score of ninety-six points. Some of the stripping of this was on the coarse side, and the butts were slightly stained. A. A. Brown, Waikanae, came fourth with an ordinary commercial bale of "fine," not specially

prepared. It was a very creditable parcel, and was awarded eighty-one points.

#### THE AUCKLAND POSITION.

With the present highly gratifying prices ruling for our Native fibre, general activity is evident in those districts where milling of late years has proved unprofitable. Considerable phormium will be milled in the Auckland district this season, even though the available supplies of the raw material in that district are steadily decreasing. With better drainage of the great northern swamps it was expected the business of fibre-production would expand, especially as the big drains would provide a cheap means of transporting the leaf; but the very opposite has been the case. With the development of drainage the swamp lands are proving valuable for agricultural purposes, and the flax-plant is gradually disappearing. There is considerable leaf in the Tawa Swamp (between Te Awamutu and Te Kuiti), while swamps on the east coast are producing large quantities; but generally there is small chance of fibre-extraction proving a stable industry in the north. Auckland phormium is practically unaffected by disease, but it is inferior to the southern leaf. It is more irregular in length, while the fibre is softer, it is not so strong, and it makes more tow and stripper-slips.

#### PERMANENCY OF THE INDUSTRY IN THE MANAWATU.

In striking contrast to the northern outlook is the position of the northern Manawatu as a phormium-producing centre. With about 15,000 acres of the raw material in practically one solid block, growing on land conserved to phormium till human ingenuity can devise a means of preventing its periodic flooding by the Manawatu River, an ideal environment is provided for a supply of the leaf. The concentrated source of supply enables the business to be conducted on bedrock values, the huge quantities of leaf surrounding the mills enabling the cost of production to be reduced to a minimum. Added to this, mill hands, having a guarantee of employment, are settling down to the work, thus providing better qualified labour, and assisting to place the industry on a solid basis. The miller, by reason of stability being assured to his industry, is encouraged to erect up-to-date mills provided with the most modern appliances for dressing the fibre. At the present time a mill is in course of erection in the district, which is estimated to cost £8,000. It is being built on solid and enduring principles, and will be equipped in a manner which will constitute it a model. A feature of this mill will be a 130-h.p. gas-producing plant.



## ACTIVITY IN THE SOUTH.

Considerable activity is taking place in the South. Fully fifty mills closed down for the past three seasons are resuming operations. In several cases they are being equipped with the latest labour-saving machinery, the particular owners having the encouragement to do this by reason of large supplies of good leaf being at hand. The installation of the automatic washing-machine has considerably improved the colour of the fibre being treated. A Marlborough mill has adopted the latest machinery, and with gratifying results. Formerly the owners of this mill steeped the fibre in a running creek in order to secure an improved colour, and this process was effective; but the automatic washing has produced a vastly improved colour. It is also found that with the automatic washer the fibre can be bleached in much less time. If the improved facilities for dressing were generally adopted throughout Marlborough the fibre from this district would be the finest produced in the Dominion. Marlborough leaf is particularly good this year.



A MANAWATU FLAX-SWAMP DRAIN.

## THE APIARY.

## NOTES FOR DECEMBER.

F. A. JACOBSEN.

APICULTURAL methods differ vastly. He who has found the system that works best in his particular locality should keep to that system. The procedure to be followed during the ensuing weeks is a repetition of what has been going on for some considerable time.

The control of swarming according to the methods outlined in last month's *Journal* should have been effected, and all colonies be now vigorous and ready for the season's harvest. What better sight for the beekeeper than to see his thousands of workers flying energetically from their respective hives, each endeavouring to outstrip the other in its nectar-gathering mission.

With the season rapidly approaching no time must be lost in preparing everything for the honey campaign. Supers will be the main thing to see to just now. Plenty of these should be on hand, in order that the fullest advantage may be taken of the flow. As soon as a colony shows sufficient strength put a couple of frames of brood from the brood-chamber into the centre of a super, and replace them with foundation or clean-drawn combs, putting the super on the colony. The exact number required cannot be estimated, as this will depend on the weather; but careful watch must be kept on all hives, and fresh ones added when required.

## A RECORD SYSTEM.

Have you a complete system for recording all the events happening in your little bee kingdoms? If not, you should adopt one at once. Method means so much in apiculture, and yet how few realize it. A complete record embracing everything that is necessary, and at the same time neat and attractive, is the following (see cut).



It is cheap (being made of tin), and is simple of construction. The back portion is tacked on to the brood-chamber, and so becomes a fixture, while the slide can be shifted from one hive to another. This is preferably made of zinc, to permit of it being written on with a pencil. The number of the hive is stencilled on the front, and when the slide is drawn out the back portion can be written on and used as a record-plate. Should a colony swarm, this record accompanies the old queen, and is transferred to the hive-body in which the swarm is placed. At the end of each season the records may be copied into a book, and the slide be cleaned ready for another season.

#### GENERAL INFORMATION.

The Californian Department recently issued a bulletin, under the heading of "Information for Apiarists," which treats of the distribution of plants and their relative value as suppliers of honey and pollen. Local atmospheric conditions play an important part in the quantity of nectar produced by different plants, so that while portions of the present flora in California may be common to Australasia, it does not follow that the plants are of equal value. It appears that the chief difficulty of beekeepers in California is in obtaining supplies of pollen during the autumn months, and apparently the only way to modify the trouble is by the tabulation of data in various places, thus making it possible to introduce plants that will flower over certain periods.

#### DRUGS.

As bearing out what has previously been recommended by this Department, the following is reprinted from "The Farmer's Bulletin, 442," of the United States Department of Agriculture, by E. F. Phillips, Ph.D., Officer in Charge of Bee-culture: "Many European writers have in the past advocated the use of various drugs for feeding, in sugar syrup, to diseased colonies or the fumigation of contaminated combs. In the case of American foul-brood, of which the cause is known, it has been found that the drugs recommended are of not the slightest value, and no time should be wasted in their use."

#### INTRODUCTION OF ITALIAN STOCK.

On this subject Dr. Phillips writes, "Since Italian bees seem to be better able to withstand European foul-brood than are other races, it is recommended that apiaries in regions where this disease is prevalent be requeened with young, vigorous Italian queens of good stock. This should be done whether or not the shaking treatment is given."

## QUEEN-EXCLUDERS.

A queen-excluder is an article designed to prevent the queen entering any supers over the brood-chamber. It is used extensively by some extracted-honey producers, while it is condemned by others—another example of varying environments demanding amended procedure. It is made of thin zinc and of the right size to fit completely over a set of frames. It contains numerous oblong holes, which are only large enough for the worker bees to pass through. Thus the queen cannot lay any eggs above the excluder, but is confined to the lower portion of the hive. If not used with judgment the swarming impulse is created through the queen overcrowding the brood-chamber with brood. It is very annoying at extracting-time to have young bees in many of the super combs. This means much wasted energy, hence the use of the excluder. About the middle or towards the end of the swarming season the majority of the hatching brood is shifted to an upper story, fresh combs being inserted to replace these. The excluder is now placed in position directly above the brood-frames. The queen must be found and placed in the brood-chamber, otherwise the plan will be a failure. Providing this has been done correctly, things will go on as harmoniously as before. The young bees will hatch out of the combs put in the supers, and in their stead the cells will be filled with honey, while later on extracting with broodless combs will be a pleasure.

## THE DEVELOPMENT QUESTION.

Many seem to be in doubt as to exactly how long it takes the three different eggs to hatch and mature. The exact periods are as follow:—

| —      |    |    | Egg.   | Grub.  | Pupa.   | Full Period. |
|--------|----|----|--------|--------|---------|--------------|
| Drone  | .. | .. | 3 days | 6 days | 15 days | 24 days      |
| Worker | .. | .. | 3 "    | 5 "    | 13 "    | 21 "         |
| Queen  | .. | .. | 3 "    | 5½ "   | 7 "     | 15½ "        |

Experiments are being conducted at the Weraroa Experimental Farm this year with a number of oats. The following are the varieties being tested: Triumph, Danish, Goldfinder, Sparrowbill, Black Excelsior, Black Tartar, Dun, Algerian, Besler's Prolific, Ruakura Rust-resistant, Halive-de-Mesday, Rosebery, Webb's Challenge Black, Abundance, Black Rival, Short Tartar, Garton.



## ORCHARD WORK FOR DECEMBER.

W. A. BOUCHER.

### CULTIVATION.

IN order that orchard trees may continue to develop vigorously throughout the summer months it is most essential that moisture should be retained in the soil during the growing season. Under most circumstances this condition can only be secured by persistent and thorough cultivation, to check any growth of weeds or grass, and to provide such an earth mulch as will prevent the evaporation of moisture from the subsoil. In anticipation of the warm, dry months of summer the soil of the orchard and garden should be brought into and maintained in the best possible condition, so that the trees may have the fullest opportunity to retain their vigour and develop their crops.

### CODLIN-MOTH, LEAF-ROLLER CATERPILLAR, AND BRONZE BEETLE.

With the approach of the warmer summer weather these enemies of the fruit-grower will become increasingly troublesome. Consistent and regular spraying alone will check their ravages. For the codlin-moth and leaf-roller caterpillar spraying with a reliable brand of arsenate of lead will provide the best means of securing clean, unblemished fruit, but in localities where the attack of bronze beetle is very severe the addition of resin solution to the arsenate of lead will be necessary.

### APPLE AND PEAR SCAB.

Up to the time of writing, the season has proved exceptionally favourable to the development of these fungus diseases, while unsettled weather in many districts has considerably interfered with spraying-operations. For this reason it may be necessary for growers to spray with the Bordeaux mixture, 4-5-50 formula, up to a somewhat later period than usual, adding, of course, the arsenate of lead for the control of codlin-moth.

### LEECH.

The attacks of this pest on the foliage of the pear, cherry, and plum should never be allowed to pass unnoticed. In the case of trees regularly sprayed for the control of codlin-moth further treatment for leech will not be necessary—in fact, arsenate of lead is recognized as being the simplest and most effective method of dealing with the pest. But there are some fruits, especially some varieties

of plums, so susceptible to injury to foliage if sprayed with arsenate of lead that it is advisable to substitute hellebore powder in the proportion of 1 oz. to 2 gallons of water. In gardens, where but a few young trees are attacked, careful dusting at intervals with dry slacked lime or wood-ashes will have the effect of removing the leech from the leaves.

#### PEACH-APHIS.

This pest usually makes its appearance very early in the season, and, being rapidly reproductive, no time should have been lost in taking the necessary measures to keep it under control. Directions for this were furnished in the October issue of this *Journal*. The advice may be repeated for the benefit of those who may have overlooked the aphid in the early stage of infection: Boil in a closed vessel 1 lb. of strong tobacco (or 3 lb. tobacco-waste) with 3 lb. soft-soap in 2 gallons of water; then add 18 gallons of water. As some difficulty occurs in destroying the fully developed aphid, a second application of the mixture should be made four or five days after the first spraying, in order to destroy the young generation produced by the fully developed aphid which escaped destruction at the first spraying.

#### CHERRY LEAF-SCORCH.

If the necessary measures for control have not been taken earlier in the season this troublesome fungus disease will now be well developed. The effect will be readily noticed by the discoloration and dropping of the leaves. To prevent further injury, spray thoroughly with the Bordeaux mixture, 4-5-50 formula.

#### GOOSEBERRY LEAF-SPOT.

As soon as the crop of berries has been gathered spray all bushes with the Bordeaux mixture, 4-5-50 formula.

#### BLACK-SPOT AND MILDEW OF THE GRAPE.

The weather-conditions at the present time indicate that black-spot is likely to cause considerable trouble this season unless the advice given in the October issue of this *Journal* has been followed and continued. Frequently during the month of December, especially in the north, a low temperature and frequent cold showers are experienced. Such climatic conditions favour continued development and spread of the fungus, which causes injury to the young canes and spot on berry and leaf. The preventive treatment previously recommended — *i.e.*, spraying with the Bordeaux mixture, 4-5-50 formula—should be continued until warm dry weather sets in. This treatment for black-spot is also effective in preventing the attack of mildew in the early part of the season.

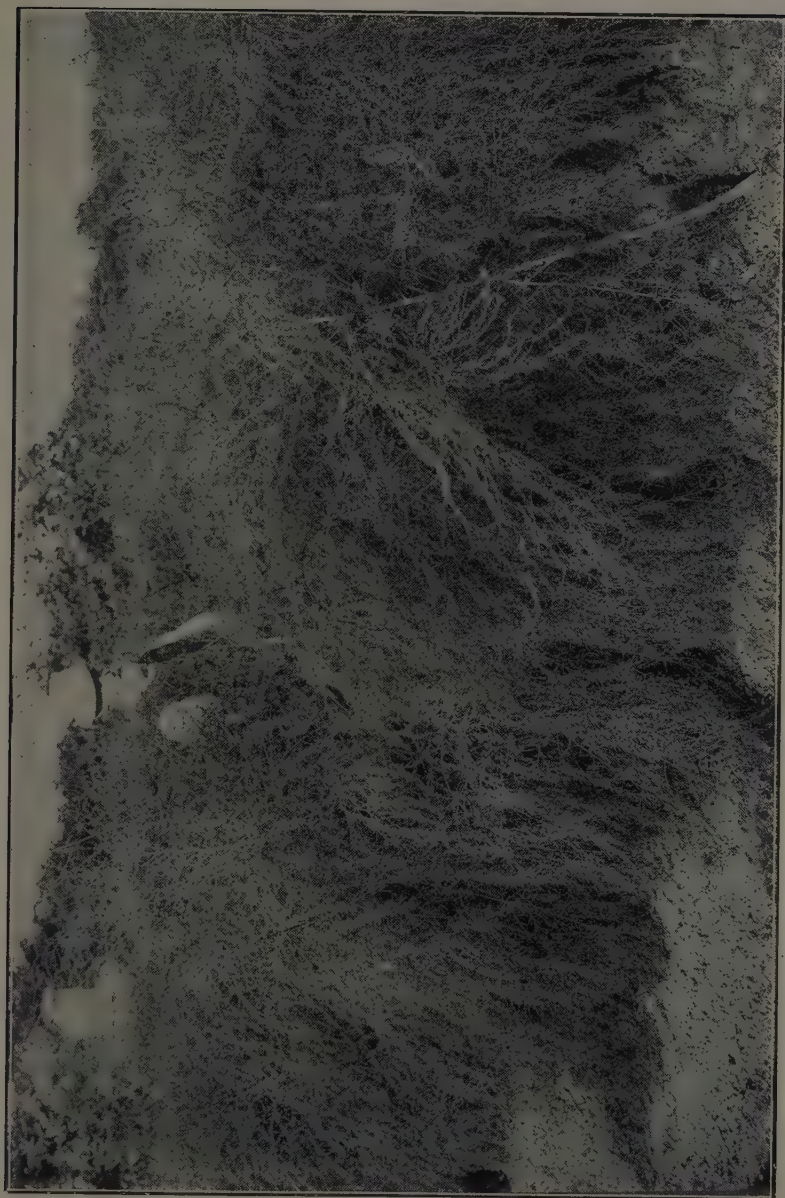
## THE FARM GARDEN.

W. H. TAYLOR.

## VEGETABLE CULTURE.

*Asparagus.*—The successful establishment and maintenance of an asparagus-bed requires the exercise of some patience. To those who are not acquainted with the physiology of the plant there is always a tendency to cut too early in the case of young beds, and too long in the case of established beds. Frequently unpleasantness is caused by foolish demands. The writer has experienced it, but has the satisfaction of knowing that he always resisted unreasonable requests that would have been destructive if yielded to. One thing that causes difficulty is the fact that asparagus is quoted in market sales throughout the whole of the summer. This gives rise to the question, why can mine not be cut when market growers are cutting theirs? Without being actually acquainted with the facts, I imagine that beds are frequently being destroyed, perhaps because they have been worked so hard that they are no longer profitable. In that case cutting would be continued as long as there was anything to cut, and that would be the end of the plants. Or it may in some instances be due to imperfect knowledge. Beds should not be cut from the first season after planting, however well they may grow. Every shoot should be allowed to grow and die off. The second season a very little may be cut if the plants have done well, but it must be very little, and to cut none at all would be the wisest course to pursue in any case. The third spring should produce an ample supply, but this will not be the case if they were robbed much the previous season. Cutting from established beds should in all cases be discontinued when peas are in good supply, except when it is intended to destroy the bed, and presuming that the supply of peas has been arranged to come in at the proper time. In the Wellington Province the time to cease cutting asparagus will be early in December. When cutting ceases it will pay to give the bed a mulch of stable or farmyard manure. This is in accordance with modern practice, the idea being that the plants require assistance for the summer growth rather than giving vast quantities of manure in winter, when much of it is wasted by being washed away by rain.

*Cultivation.*—In all parts of the garden as much cultivation as possible should now be done. The present spring has been fraught



THE ASPARAGUS BED AT WERAHOA EXPERIMENTAL FARM, W. H. TAYLOR, THE HORTICULTURIST, IN THE CENTRE.

with difficulties. A paucity of sunshine, with consequent low temperature and frequent showery weather, has caused very slow progress in growth, except among weeds, and the increase of slugs has been more than abundant. Frequent cultivation assists growth by promoting aeration of the soil, checks weeds, and destroys many slugs, which, in the absence of other shelter, take refuge in crevices between and under clods of soil. Break these clods down, and attend not merely to the actual spot occupied by crops, but to the surroundings also. Rubbish beneath trees and hedges also shelters slugs, and should be removed. Where there are box edgings along paths, these should be kept in narrow limits. A large edging of box is an abomination that should not be tolerated; it forms a most congenial harbour for slugs and snails.

*Peas* should be sown twice during the month. Choose a variety whose height does not exceed about 30 in., unless sticks can be provided for support, and remember it is only by providing sticks that the best results can be obtained. When the haulm is kept clear of the soil growth is better in every way, and the pods are finer and cleaner. The additional facilities afforded for cultivation alone make the cultivation of taller varieties worth while.

*Red cabbages* should be planted as soon as possible.

*Cauliflower-plants*, from seed put in as previously advised, should not be allowed to crowd each other in the seed-bed. Lift the requisite number and put them about 4 in. or 5 in. apart in a nurse-bed to strengthen. They should be planted out finally in good soil before they reach an unwieldy size.

*Brussels sprouts* should be advancing contemporaneously with the cauliflowers and be similarly treated.

Small supplies of *turnips* should be provided for by sowing once a month. They are not usually required in large quantities during summer, but a constant supply of tender roots is desirable, if only for flavouring purposes.

*Broccoli-plants*, being hardier than cauliflowers, are less likely to be spoiled by crowding; it is not, however, good practice to allow this. It is better to treat them the same way as cauliflowers. This secures dwarf plants in place of awkward leggy ones.

*Onions* should be kept free from weeds and the ground kept loose. They will seldom do well unless this condition is maintained. The loss of onions from mildew is very great in some districts, and the loss is greatest in wet seasons, particularly in low and flat country. It is wise to spray several times for the control of this disease. It is useless to wait till the plants are severely attacked before spraying, for then very little good may be done. The plants should be sprayed as soon as they begin to grow freely, repeating it several times unless the weather should prove dry and sunny; in any case a spraying



should be given in January. The remedy is Bordeaux mixture of 5-5-50 strength. As the Bordeaux mixture does not readily adhere to onion foliage, and is easily washed off by rain, it is advisable to use a resin sticker with the mixture. To make the sticker, boil together 2 lb. of resin, 1 lb. of soda-crystals, and 1 gallon of water until a clear brown colour appears. Add this amount to 50 gallons of the Bordeaux mixture. There is some danger of burning the foliage. Massee, in "Diseases of Cultivated Plants," advises, instead of Bordeaux mixture, 3 per cent. of sulphate of iron dissolved in water, which he says is quite as effective against mildew, cheaper, more easily prepared, and does not injure the foliage. The strength should be 3 lb. of sulphate of iron to 100 gallons of water.

*French beans* should be sown at intervals of from three to four weeks. Most people will prefer the golden-podded sorts—butter-beans. There is some confusion as to names of varieties. The variety with large brown seeds is decidedly the best. Some catalogues call it Mont d'Or; others give a small black seed under that name. The black-seeded sorts produce beans that are too small to be generally appreciated, though they are of excellent quality, but not better than the larger. Wood's Centennial is a good variety; it may be termed the second best.

*Lettuces* can be got ready for use in the shortest time by sowing the seed where the plants are to grow, thus avoiding the check caused by transplanting. Sow the seed thinly in drills, and thin to the necessary distances.

*Spinach* is always useful, and should be sown once a month during summer. Sow between rows of other vegetables unless there is plenty of space; even in that case it is often worth while to do so, as it saves labour. When the soil gets dry it sometimes happens that seed of spinach does not germinate so rapidly as might be wished. To hurry it, water the drills thoroughly through the rose of a watering-pot after the seed has been sown, but before covering it up. The same plan may be adopted with lettuce, and is particularly effective with peas. Evaporation is prevented by the covering of loose soil, and the moisture remains for a considerable time; this plan is far better than soaking the seed in water and then consigning it to dry soil.

*Celery-plants* should be coming on rapidly if sown under glass and pricked out in boxes. Let them stand out in the open for several weeks before planting, so that they may become thoroughly hardened. If planted too quickly they are so soft that it is hard to get them to start, as they wilt severely in the sun. If seed was sown in the open ground the resulting plants should soon be ready to prick out. On no account leave the plants long in a crowded state. Success depends on keeping the plants growing strongly at all stages. Trenches for celery are made by digging out the first spit and

shovelling out the loose crumbs. Then dig a liberal quantity of good rotten manure into the bottom spit. The width of a spade is sufficient for a single row, and for the home garden a single line is best. Plants when ready may be put out with a trowel, securing as good a ball of roots and soil as possible. Plant on a dull day if opportunity offers, or towards evening if a bright day. Give a thorough soaking of water after planting.

*Rhubarb-seed* of the winter variety may be sown at once. The plants will then have time to grow usable stalks before autumn is past. The soil must be rich and of a free character.

*Tomato-plants* should be out in most places by now. The only attention required for a time will be the suppression of side shoots. Whatever system of training may be adopted no side shoots should be allowed. Pinch them all out as soon as possible after they show. The main stems, which bear the fruit, whether there be one stem, two, or three, should be kept clear of all waste growth. The leaves on these stems should all be kept. They are necessary to the fruit.

If the main crop of *parsnips* and *carrots* has not yet been provided for, seed should be got in at once. The same applies to *cucumbers*, *melons*, *pumpkins*, &c.

#### FLOWER-CULTURE.

*Climbing roses* provide for their own renewal by the production of long rods. These are frequently regarded as a nuisance, and cut out. That is wrong. The best flowers are most frequently produced by these long rods. Due care should therefore be taken of them in sufficient numbers to meet the requirements of the different plants. The usual way of dealing with climbing roses is to promote in the first place as strong a growth as possible, so as to secure a sufficiency of rods to lay in and cover the allotted space. These rods the ensuing spring push side shoots from every joint, each terminating in a cluster of flowers. When the next pruning-time comes all the side shoots are cut back to short spurs. This process may be continued for another year or two if desired, but it is best to lay in some new rods each year—about half the total number required—and cut out enough of the older rods to make room for them. In this way the rods are seldom spurred more than once, unless it happens that there are not enough new ones made to continue the practice. This explanation is made as a guide as to what to do with young rods at the present time: it indicates what number may be required. If there are more than will be wanted, destroy them at once by cutting them hard back.

*Spring-flowering shrubs*, being mostly out of flower, should now be pruned. I say "pruned" advisedly: they should not be shorn.

Very rarely is it right to prune these shrubs with the hedging-shears: this usually creates a monstrosity. The branches should be thinned and shortened with an object in view every time. The object should be to form well-shaped bushes, even in contour, yet without the closely clipped appearance we endeavour to secure in hedges. Such subjects as *ceanothus*, *deutzia*, *weigelia*, *forsythia*, *guelder-roses*, *mock-orange*, &c., come under this head. Others seldom require more than a few branches cut back to keep them to desired limits. Among these are *Choisya ternata* and lilacs: these naturally form well-shaped bushes, and the stronger they grow the better they flower. Those bushes that are pruned should have straggling branches cut back, and if this is done in good time the resulting growths will flower well next season, and should not be pruned in any way whatever during winter. *Escalonia montevidiensis*, formerly known as *E. florabunda*, flowers about Easter-time. It is one of the best flowering-shrubs of that time, but it is satisfactory only when left unrestricted during summer: it is then in due time clad with a profusion of its pure-white blossoms. Any pruning required should be done immediately after flowering.

*Tulips and hyacinths* should be lifted every year. The time to lift them is when the foliage is sear, but before it is quite dead. The natural covering of a tulip-bulb is an envelope of a brown colour. This envelope is nature's provision for the protection of the bulb from wet, &c. If the bulbs are not lifted until the foliage is quite dead the brown envelope usually peels off, though if it were left in the ground it would remain on the bulb minus the outer covering. The bulb is white, quickly becoming disfigured with brown patches, the result of injury or contact with sun and air. After lifting the bulbs, they should be laid out to dry in a semi-shaded place until the foliage dries up. It will then part readily from the bulbs, which may then be stored in boxes or drawers. Do not wrap them in paper: I have seen valuable collections of hyacinths lost by doing this. The bulbs require a certain amount of air. They are safe in loose paper bags, but safest of all in open boxes in a dry shed. Bulbs are often lost for want of a little foresight and lack of proper methods. When they die down they are out of sight, and a person well acquainted with the contents of the garden may easily overlook them, while if a stranger gets to work hoeing or digging, the loss may be serious—a clump of bulbs may be cut in pieces or dug in without its being known. Care should be taken to mark every clump with a lasting label. A bit of stick may mean nothing: write the name distinctly on a painted label. It is a good plan to put a small mound of clean sand over the site of each clump: this serves as an additional

mark, keeps the soil from cracking, and no weeds will grow on it: thus the bulbs are safe against all contingencies.

It is now time to complete all arrangements for summer planting and sowing. Seed of all things of the nature of asters may be sown in the open, but there should now be no delay, and plants of like nature should be got out at once.

#### THE MANURE-HEAP.

In all the economy of the garden there is nothing that pays better than giving a little attention to the manure-heap. If stable-manure is thrown into an indiscriminate heap and so left it is of little manurial value, for when it is taken for use it is found to be a mixture of dry straw, fit only to burn, literally rubbish, and in places perhaps a wet sodden mass with the best parts washed out. Probably no one better appreciates the value of a few turnings and shakings-over than a gardener who has to undertake the formation of a hot-bed from that material. Fermentation cannot properly take place without an occasional shaking-over, for an undisturbed heap invariably becomes too dry in some parts, too wet in others, and it also gets matted down in such a manner as to exclude air, and without air fermentation cannot take place. Further, even if fermentation did go on—and it does in some parts of the heap—the vapour that escapes is a valuable part of the manure going to waste. However, it is not my intention to deal with the scientific side of the question, but merely with the physical aspect as involving economy of labour and material.

Before the manure has long lain in the open air it should be shaken over, all knots should be shaken loose, and the stuff thrown forward into a loose heap. The dry and strawy parts should be worked as much as possible to the centre, an extra wet forkful thrown into the extra dry. The heap should have a broad base and razor-backed top. This will serve to throw rain down the sides instead of allowing it to soak all through and wash the goodness out. When the heap is finished, comb the sides lightly down with a fork: this forms a kind of thatch to throw water off. It should be understood that it is not desirable to throw all the rain off, simply to throw off the flood; a proportion trickling through the heap is desirable. In a few days a strong heat will rise; the heap should then be turned over again. It will be easier and quicker done this time, for all the knots are gone. Once more the heap will require turning, when the heat again rises. This repeated turning is to prevent waste by escaping vapour, and burning from excessive heat: the burning would make the heap dry. Usually the three turnings will be sufficient; heat is after that more moderate. The

third turning will find the stuff quite easy to move—no dragging to get a forkful out—for every part has become short. It is all alike—scarcely a particle of difference all through the heap. In this condition it is easily loaded on to dray or barrow, and every scrap is fit to dig or plough in. The labour that has been expended in the turning will be paid for over and over again, not alone in the value of the material, but by the saving that will be effected in the last handling. For it must be remembered that the heap has to be disposed of at some time and in some manner, and this method involves less labour than burning the heap to get it out of the way. When the heap is being turned over the first time it is sometimes necessary to throw water on very dry parts.

#### SMALL FRUIT.

*Strawberry-runners* should be treated in a systematic manner. Good plants cannot be assured by haphazard methods. Gathering fruit should be done from alternate alleys. This will leave half the number not trodden on, and these can be used for layering the runners. It is best to take only one plant from each runner, though this may not always provide enough plants, in which case more can be taken. The important point is to get them to root early, and not to waste strength by allowing a lot of useless growth to be made. Stop all further running as soon as sufficient plants are secured. Rooting is facilitated by placing a small clod of earth on the runner close to the young plant.

Keep surplus suckers cut out of the *raspberry-beds*.

Attend to the stopping of shoots on *red currants* as before advised. Look over *gooseberry-bushes* and pull out surplus gross shoots. These often result from shortening back branches in winter. They are easily pulled out at this time, and when this is done they will not recur. I am strongly opposed to pinching back all the shoots on *gooseberry-bushes*, as is often done in the colder parts of the Dominion, where, however, the practice may be safe. It is dangerous in other parts, and often results in crippling growth.

*Loganberry-bushes* have a habit of producing strong suckerlike canes. Preserve them all: they will produce fruit next year. Tie them in loosely, so as to preserve them from injury. If the plants are young the rods may be at once secured in their proper places, bearing in mind that the fruit is borne on short laterals that will spring from every joint on the rods. If the rods are trained to a board fence they may be laid 12 in. apart—this will give ample room for the laterals; but if they are merely tied to stakes a less number should be kept, for the laterals will be much longer owing to having less exposure to light.



## THE POULTRY INDUSTRY.

F. C. BROWN.

### OVERCROWDING.

THERE is no more fatal source of loss in rearing than that of overcrowding chickens in the brooder. Overcrowding is bad in any department of the plant, but it is specially disastrous with the young tender stock. Perhaps the most important fact disclosed by modern investigators of poultry-keeping is the necessity of fresh air to poultry, and if this is so in regard to adult stock it is even more true in the case of chickens. To overcrowd simply means that the inevitable loss will reduce the numbers to such an extent that those surviving will probably be less than the number the brooder is capable of holding. Then again, even where the overcrowding is not great enough to bring about heavy mortality, the excess of numbers makes it difficult to give the chicks the necessary time in the heated brooders to permit the cooling-off process to be done gradually enough. It is always a safe practice to provide ample brooder-space. As a general rule a man purchases an incubator and a brooder at the one time. From the incubator he may get eighty chicks, while the brooder-capacity is only fifty. Not only is the brooder greatly overcrowded, but the incubator being immediately refilled means that another batch of chickens will be ready for the brooder before the first lot of chickens can be safely transferred. The surest plan is to have two brooders for each incubator—fifty chickens in one compartment is quite sufficient for the best results—and, as in all details of poultry-plant management, look well ahead, and never rear more than can be subsequently handled to advantage.

### THE MARKET COCKEREL.

Any early-hatched cockerel on the plant it is not intended to keep for breeding purposes should be fed in such a way at the present time that he will be rapidly laying on flesh in order to be prime for the Christmas market. He should be in special quarters—anywhere where he will see only members of his own sex and will have only limited range. He should receive the best of treatment, for no profit can be made from a cockerel sold as a table bird which is neglected in any way or is kept on a lean diet. One means of reducing the cost of production is to feed ground maize and oats instead of wheat

in the evening. On the farm the morning mash should be well mixed with skim-milk—there is no better food for poultry-fattening. Skim-milk can also be given as a drink, provided it is fed in clean shaded vessels. It should not be fed sour as a drink, while it is decidedly preferable if pasteurized. The marketing of cockerels is very much like disposing of lambs. It is the early one brought rapidly to maturity which is the most profitable. The production of a maximum weight of flesh in a minimum period of time is the ideal to be aimed at. After going to the trouble the grower should aim at selling his cockerels by the pound. Poulterers are prepared to buy by the pound if they are offered good stuff, but they are looking for something better than stores. One little point that may be referred to in purchasing by the pound is the unavoidable loss in weight in railing or shipping live birds. On being despatched from the farm they probably have their crops and intestines full, with the result, especially if the journey is a long one, that they do not weigh so well on arrival at the market or the purchaser's premises. A good allowance must be made for the reduction in weight unavoidable in travelling.

#### INCUBATING TROUBLES.

A trouble which is fairly common, but which unfortunately cannot be rectified at this stage of the season, is the loss of chickens, generally when about ten days old. A case came under my notice the other day where heavy mortality occurred for several seasons in succession. Acting on my advice, thorough ventilation was provided in the incubator-room, and the trouble at once ceased. The cause was apparent. The brooder-house was all that could be desired, but the incubator-room was close and stuffy. The owner imagined that the securing of the desired temperature implied the exclusion of all air, with the result that no ventilation was provided, the only means by which fresh air could gain an entrance being through the door and a small window alongside the door. Holes were then made at each end of the building, and special ventilators, to carry off the lamp-fumes through a funnel in the roof, were placed over each lamp. It should be remembered that, provided the necessary heat and moisture is applied to the eggs, it is hardly possible to provide too much ventilation. I have seen ventilators placed in the roof, but no provision made for admitting air at the bottom. A good idea is to insert a small drainpipe here and there at the base of the walls and on an angle of 45°, with the inclination upwards, so that the air may flow up into the room. Ventilators in the roof are, of course, also essential. The bottom ventilating-pipes should not be in direct line with the lamps, otherwise these are apt to flicker. The bulk of the so-called epidemics taking place

among young chickens can be traced, I am convinced, to insufficient ventilation in the incubating-room, or to defective management in the brooder-house. After all, it is a repetition of the common practice to blame anything but one's own want of understanding of a principle. The best men on incubating and brooding in the world have much to learn in regard to artificial rearing, and it is only to be expected that the layman will make mistakes in the process of gaining the necessary experience of rearing chickens by artificial means with constant success. The most successful man is he who runs only one incubator, and by experience comes to thoroughly understand that particular machine, while, being the only machine in the room, there is probably no stagnation of the foetid atmosphere. On the other hand, the man running a number of machines—often of various makes, each requiring different treatment—will have them crowded in the one compartment, which naturally becomes stuffy and insanitary unless means are taken to provide special ventilation. The same thing applies to the brooder-house, though probably to a lesser extent. I have repeatedly seen a man who made a decided success of artificial rearing when using but one small incubator have heavy and constant losses when launching out on a large scale.

#### LATE-HATCHED STOCK.

Even during this month sittings are being put down, and this of the heavier breeds, due no doubt to the inability of those who have to depend upon the natural method of incubation to secure brooding-birds. Where this is so every care is necessary in the matter of shade, shelter from adverse weather (especially wind), provision of green food, ample nourishment, &c. If these chickens (hatched certainly in the natural time but not at the best period for winter egg-production) are to prove profitable—that is, lay when eggs are dear—they must be managed to the very best advantage. Even if they do well and come to lay at an early age, they but catch the tail-end of the best season, instead of commencing their productive period at the beginning of it. If they are, however, allowed to take their chance, November chicks will probably not lay till next spring, and therefore will prove non-payable stock. The only definite system by which the small producer can conduct egg-production on a profitable basis is to hatch artificially and use a fireless brooder. As the work expands a heated brooder should be employed to give the chickens a start for four or five days. Not that they cannot be reared successfully without this, but its use saves the time taken up in educating the chickens to run in and out for the first few days, necessary under the fireless-brooder system. There is no need for a special room for the incubator provided a good reliable make is employed, but the cool brooder should certainly be under shelter, not only to secure the best results, but for the com-

fort of the attendant. A common mistake is to purchase second-hand incubators and brooders. They invariably find their way into a sale-room because they have failed to give satisfaction. To purchase them is only to invite trouble. It is generally the case that the successful man discards a machine to purchase a better one, and the amateur secures the discarded one. If the former finds an up-to-date outfit more profitable it is imperative to the amateur.

#### CULLING.

No man has built up a highly profitable flock who has not vigorously culled. While February and March are the best time of the year for this, good weeding-out work can be done in December. True, it demands considerable judgment to safely cull next month, but any culling is a great advantage to the plant, inasmuch as the young stock are developing and are making greater demands on the accommodation available. The only guide to successful December culling is the appearance of the birds. The bird above the average weight of the breed and looking in the pink of condition is very often the drone, but care must be taken in discarding her to see that the undesirable weight is not the result of an enforced rest. The safest principle is to cull out all birds showing any weakness in constitution. At the present time a good many birds will be taking a rest, but with these it will be merely a prelude to a heavy laying period in the late summer and autumn. It is always the poor-constituted bird which goes into an early moult, and there is no place for the early moulter where poultry is being kept for profit. Do not confuse the undesirable bird with the heavy layer, which, having just got through a heavy laying period and is preparing for more egg-production, is thin and light for her size. I realize the difficulty of distinguishing between the two classes of birds, but it may be taken as a good guide that the thinnest birds at this time of year are the heaviest layers in the flock.

#### FEED THE BIRDS.

I visited a plant the other day to give advice as to why the pullets were not laying. Eleven months old they were, and they had not laid an egg. The owner was asked to feed them, as want of nourishment was apparently the cause of the trouble. He fed them with a ration which he said they received without fail every evening—a small tin of wheat, which was barely sufficient for a quarter of the birds. The owner followed my advice to give the birds as much as they could eat at each meal without waste, and the result has been gratifying. He admitted he was one of the many victims of the stupid advice that it is a mistake to give birds all the feed they will take. The high-type layer cannot be overfed with the right class of food. It stands to reason that such a small animal producing two-ounce eggs

(containing the most highly concentrated animal product known) day after day almost without ceasing, must have the material, and that of the right kind, to do it with, and then have something to maintain the great bodily vigour demanded of her. Of course the poor layer can be overfed, and she will soon declare the fact by her fat condition. If so she should be at once potted, for the laying on of condition at once proves that she is an unprofitable layer. The only payable bird is the one who gives up her life to egg-manufacturing, and she must be encouraged in every way (especially by good feeding) if she is to make a thorough success of her business.

#### TESTING THE EXPORT TRADE.

The trial shipment of eggs forwarded by the Department to the Vancouver market, and described in the last issue of the *Journal*, was entirely satisfactory. The eggs realized 36 c. (1s. 6d.) a dozen, which it is expected will give a net return of 1s. 3½d. The shipment reached the market in excellent order; in fact, the condition of the eggs, in the words of the Vancouver agent, could not have been more satisfactory. One private shipment has since been made to Vancouver, but any endeavour to establish a connection with the markets of British Columbia has been checked owing to no space being now available for eggs on the steamers engaged in the trade.

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#### COOL BROODERS.

##### A. CARR.

WHAT is proving a decided improvement on the cool-brooder hover hitherto employed at the Milton Poultry-station is a circular metal adjustable hover I have designed. This is made of sheet zinc, 1½ in. deep, with a ½ in. flange top and bottom, to stiffen it and also to hold the curtains and top in position. This framework is supported by three flat legs, 1½ in. wide, turned in at the bottom 1 in. These legs are adjustable, allowing for an expansion from 4 in. to 8 in., being made of two pieces, one of which is an extension of the other, this extension being fastened through holes at varying distances by a small nut bolt. Thus the hover can be raised as the chickens develop. The hover stands in the centre of the box, as can be seen from the illustration, and having no sides there is no possibility of the chicks being crushed into corners. The piece of pure-wool blanket which covers the hover is fastened on with a piece of tape or string, the curtains, of the same material, which depend from the cover being attached by a safety pin. A frame for twenty-five to thirty chicks should be 16 in. in diameter, and for fifty to sixty chicks 21 in. A brooder-box (in which the hover is placed) to accommodate sixty chickens should have an inside measurement of 40 in. by 32 in., being 17 in. high at the front and 12 in. at the back. The windows, front and back, measure 16 in. by 10 in. Doors, 5½ in. by 4½ in., with 1 in. slide 8 in. by 5 in., are placed both back and front, in order to be able to change the run to either end. The roof is hinged in front and is made large enough to project over the brooder-



box, in order to make the box as weatherproof as possible. The framework is made of  $1\frac{1}{2}$  in. by 1 in. material covered with T. and G. timber, 5 in. by  $\frac{3}{4}$  in. The floor is made of T. and G. 5 in. by 1 in., and is raised on runners 2 in. by 2 in., to allow for circulation of air underneath. The wire frame provided inside to keep the chicks from hopping out when the lid is raised is made of  $1\frac{1}{2}$  in. by 1 in. material covered with  $\frac{3}{4}$ -in.-mesh netting, and is raised 9 in. off the floor by means of 1 in. by  $\frac{1}{2}$  in. ledges. A door, 16 in. by 9 in., is provided for feeding, &c. The lid, or roof, may be either zinc



THE MILTON COOL BROODER.  
Showing the new adjustable metal hover.

or rubberoid. If the latter is used it should rest on lightly constructed  $\frac{3}{4}$ -in.-mesh netting fixed to a 2 in. by 1 in. framework. The runs measure 3 ft. 6 in. by 6 ft. 12 in., and are made of 2 in. by 1 in. timber covered with  $\frac{3}{4}$  in. netting. The door (wire netting) is on top and is the full width of the run, being 15 in. wide; it is placed in the centre. The runs can be used either back or front of the brooder.

It will be seen that the whole structure is light but strong, and, being easily made, is inexpensive.

To obtain the best results from this brooder it should be under cover.

## CO-OPERATIVE EXPERIMENT RECORD.

## THE PAST SEASON'S EXPERIMENTS.

## SOUTH ISLAND.

A. MACPHERSON.

## SWEDE TURNIPS.

WEST COAST DISTRICT.

*Manurial and Variety Test, conducted by A. H. Wheeler, Rotomana, Westland.*

THE land selected was a clayey loam, and had been in grass for ten years prior to the 22nd August, 1911, when it was ploughed and tine-harrowed. It was disc-ploughed, disc-harrowed, and tine-harrowed on 10th October, 1911; harrowed and thrown into ridges and the seed and fertilizers sown on 7th January, 1912. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Sutton's Magnum Bonum. In the variety test 2 cwt. of Belfast manure was applied per acre. The test was not initiated under favourable conditions, the season being wet and the land cold. The crop was pulled and weighed on 19th June, 1912. Results:—

## VARIETY TEST.

| Plot. | Variety.                                | Crop per Acre. |       |
|-------|---|----------------|-------|
|       |   | Roots.         | Tops. |
|       |   | Tons.          | Tons. |
| 1     | Hurst and Son's East Lothian .. .. .    | 17-44          | 2-35  |
| 2     | "    Perfection .. .. .                 | 18-38          | 2-82  |
| 3     | "    Lord Derby .. .. .                 | 14-37          | 3-06  |
| 4     | "    Kangaroo .. .. .                   | 17-91          | 3-06  |
| 5     | "    Select Monarch .. .. .             | 15-32          | 1-64  |
| 6     | "    XL All .. .. .                     | 11-78          | 1-64  |
| 7     | "    Best of All .. .. .                | 20-27          | 3-29  |
| 8     | Webb and Son's New Empire .. .. .       | 2-82           | 0-23  |
| 9     | "    Giant King .. .. .                 | 10-84          | 2-12  |
| 10    | "    Imperial .. .. .                   | 6-12           | 0-94  |
| 11    | "    New Buffalo .. .. .                | 6-12           | 0-94  |
| 12    | Nimmo and Blair's Standard .. .. .      | 13-19          | 2-12  |
| 13    | "    John Bull .. .. .                  | 8-48           | 1-88  |
| 14    | Sutton's Queen .. .. .                  | 8-72           | 1-17  |
| 15    | "    Crimson King .. .. .               | 17-20          | 1-41  |
| 16    | "    Champion .. .. .                   | 14-84          | 1-65  |
| 17    | "    Elephant .. .. .                   | 16-26          | 0-94  |
| 18    | "    Magnum Bonum .. .. .               | 15-08          | 1-88  |
| 19    | Garton's Pioneer .. .. .                | 10-84          | 1-17  |
| 20    | "    Model .. .. .                      | 12-02          | 0-70  |
| 21    | "    Green Tankard .. .. .              | 15-08          | 2-82  |
| 22    | "    Perfection .. .. .                 | 10-37          | 1-88  |
| 23    | "    Cropwell .. .. .                   | 16-26          | 1-41  |
| 24    | "    Keepwell .. .. .                   | 14-37          | 1-41  |
| 25    | "    Incomparable .. .. .               | 24-75          | 5-42  |
| 26    | "    Superlative .. .. .                | 11-07          | 2-35  |
| 27    | "    Victory .. .. .                    | 10-60          | 1-65  |
| 28    | Montgomery and Co.'s Skirving's .. .. . | 14-14          | 3-06  |
| 29    | "    Reliance Bronze-top .. .. .        | 11-55          | 2-59  |
| 30    | "    Victor Purple-top .. .. .          | 8-95           | 1-88  |

## MANURIAL TEST.

| Plot. | Manures per Acre.  | Cost per Acre. | Weight of Crop per Acre. |       | Effect of Manuring. |
|-------|--|----------------|--------------------------|-------|---------------------|
|       |  |                | Roots.                   | Tops. |                     |
|       |  | £ s. d.        | Tons.                    | Tons. | Tons.               |
| 1     | Superphosphate, $1\frac{1}{2}$ cwt. ..                   | 0 7 2          | 46.43                    | 9.42  | Gain, 31.11         |
| 2     | Superphosphate, 3 cwt. ..                                | 0 14 4         | 42.42                    | 7.42  | " 27.10             |
| 3     | Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt. .. | 0 14 0         | 45.72                    | 8.24  | " 30.40             |
| 4     | No manure .. ..  | .. ..          | 15.32                    | 3.06  | .. ..               |
| 5     | No. 3 mixture, sulphate of potash, 28 lb. ..             | 0 17 10        | 53.50                    | 9.89  | Gain, 38.18         |
| 6     | No. 5 mixture, $1\frac{1}{2}$ cwt. ..                    | 0 8 11         | 47.14                    | 6.83  | " 31.82             |
| 7     | No. 6 mixture, $1\frac{1}{2}$ cwt.; salt, 14 lb. ..      | 0 9 3          | 44.54                    | 5.42  | " 29.22             |
| 8     | Albatross guano, 2 cwt. ..                               | 0 10 0         | 44.78                    | 6.36  | " 29.46             |

Inspector Walton reports: Although the sowing was done under unfavourable conditions, yet the crop did remarkably well afterwards, and the experimenter was very pleased with the results. There was no disease apparent in any of the varieties. The roots were of good quality, clean, and very solid.

## RANGIOBA DISTRICT.

*Manurial and Variety Tests, conducted by W. Davis, Amberley.*

The land selected was a loam on a shingly subsoil, and had been in grass for five years prior to being broken up on 23rd September, 1911, for the experiment. It was disc-harrowed and tine-harrowed in September; disc-harrowed twice and tine-harrowed twice in October, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The soil in the plots was as uniform in character as possible. The variety of seed sown was Sutton's Magnum Bonum. In the variety test 2 cwt. per acre of rape-manure was applied. The seeds and fertilizers were drilled in on 3rd November, 1911; drills 28 in. apart. The roots were pulled and weighed on 9th and 10th May, 1912. Results:—

## MANURIAL TEST.

| Plot. | Manures per Acre.  | Cost per Acre. | Weight of Crop per Acre. |       | Effect of Manuring. |
|-------|--|----------------|--------------------------|-------|---------------------|
|       |  |                | Roots.                   | Tops. |                     |
|       |  | £ s. d.        | Tons.                    | Tons. | Tons.               |
| 1     | Superphosphate, $\frac{3}{4}$ cwt. ..                                    | 0 3 7          | 37.81                    | 2.02  | Gain, 8.77          |
| 2     | Superphosphate, $1\frac{1}{2}$ cwt. ..                                   | 0 7 2          | 40.40                    | 2.77  | " 11.36             |
| 3     | Superphosphate, 1 cwt.; bone-dust, 42 lb. ..                             | 0 7 0          | 40.40                    | 2.27  | " 11.36             |
| 4     | No manure .. ..  | .. ..          | 29.04                    | 1.76  | .. ..               |
| 5     | Superphosphate, 1 cwt.; bone-dust, 42 lb.; sulphate of potash, 14 lb. .. | 0 8 11         | 38.63                    | 3.28  | Gain, 9.59          |
| 6     | No. 5 mixture, $\frac{3}{4}$ cwt. ..                                     | 0 4 6          | 41.16                    | 2.77  | " 12.12             |
| 7     | No. 5 mixture, $\frac{3}{4}$ cwt.; salt, 7 lb. ..                        | 0 4 8          | 37.62                    | 3.28  | " 8.58              |
| 8     | Albatross guano, 1 cwt. ..   | 0 5 0          | 39.39                    | 3.78  | " 10.35             |

## VARIETY TEST.

| Plot. | Variety.                                | Crop per Acre. |       |
|-------|---|----------------|-------|
|       |   | Roots.         | Tops. |
|       |   | Tons.          | Tons. |
| 1     | Hurst and Son's East Lothian .. .. .    | 46-55          | 4-41  |
| 2     | " Perfection .. .. .                    | 56-86          | 5-30  |
| 3     | " Lord Derby .. .. .                    | 46-55          | 3-83  |
| 4     | " Kangaroo .. .. .                      | 54-80          | 4-41  |
| 5     | " Select Monarch .. .. .                | 50-38          | 4-71  |
| 6     | " XL All .. .. .                        | 52-44          | 5-00  |
| 7     | " Best of All .. .. .                   | 55-09          | 2-65  |
| 8     | Webb and Son's New Empire .. .. .       | 65-41          | 2-94  |
| 9     | " Giant King .. .. .                    | 40-66          | 2-65  |
| 10    | " Imperial .. .. .                      | 39-77          | 2-35  |
| 11    | " New Buffalo .. .. .                   | 38-30          | 2-06  |
| 12    | Nimmo and Blair's Standard .. .. .      | 39-77          | 2-65  |
| 13    | " John Bull .. .. .                     | 46-25          | 1-76  |
| 14    | Sutton's Queen .. .. .                  | 39-18          | 1-76  |
| 15    | " Crimson King .. .. .                  | 60-10          | 2-65  |
| 16    | " Champion .. .. .                      | 53-62          | 2-94  |
| 17    | " Elephant .. .. .                      | 41-83          | 2-06  |
| 18    | " Magnum Bonum .. .. .                  | 64-23          | 2-35  |
| 19    | Garton's Pioneer .. .. .                | 28-28          | 1-76  |
| 20    | " Model .. .. .                         | 53-62          | 2-65  |
| 21    | " Green Tankard .. .. .                 | 52-44          | 2-06  |
| 22    | " Perfection .. .. .                    | 28-58          | 2-65  |
| 23    | " Cropwell .. .. .                      | 68-94          | 1-76  |
| 24    | " Keepwell .. .. .                      | 67-17          | 2-94  |
| 25    | " Incomparable .. .. .                  | 56-57          | 3-24  |
| 26    | " Superlative .. .. .                   | 48-02          | 1-76  |
| 27    | " Victory .. .. .                       | 43-31          | 2-06  |
| 28    | Montgomery and Co.'s Skirving's .. .. . | 58-33          | 3-83  |

Inspector Hughes reports: Intercultivation was not given as often as should have been during the growth of the crop, consequently weeds got away and the crop suffered in consequence. The leaves of the whole of the varieties suffered from the green-fly or aphid and the diamond-back moth. No club-root was noticeable in any of the varieties.

*Variety Test, conducted at Rangiora High School by the Agricultural Class in charge of Mr. S. A. Clark, B.A., Assistant Master.*

The tests were carried out on the school experimental area, the soil being a rich loam. Prior to the experiment the land had been for a number of years in grass. It was ploughed in May, 1911, and dug over the following September. The soil in the area was uniform in character. The seeds were sown on the flat in rows 28 in. apart on the 20th October, 1911. No manure was applied. The crop was harvested in June, 1912. Results:—

| Plot. | Variety.                             | Crop per Acre. |       |
|-------|--------------------------------------|----------------|-------|
|       |                                      | Roots.         | Tops. |
|       |                                      | Tons.          | Tons. |
| 1     | Hurst and Son's East Lothian .. .. . | 18-50          | 1-48  |
| 2     | " Perfection .. .. .                 | 36-26          | 2-22  |
| 3     | " Lord Derby .. .. .                 | 40-33          | 3-12  |
| 4     | " Kangaroo .. .. .                   | 32-19          | 2-07  |
| 5     | " Select Monarch .. .. .             | 34-78          | 1-85  |
| 6     | " XL All .. .. .                     | 32-93          | 1-65  |
| 7     | " Best of All .. .. .                | 42-18          | 2-96  |
| 8     | Nimmo and Blair's Standard .. .. .   | 31-08          | 1-56  |
| 9     | " John Bull .. .. .                  | 24-79          | 1-48  |
| 10    | Sutton's Queen .. .. .               | 37-00          | 2-75  |
| 11    | " Crimson King .. .. .               | 26-27          | 1-66  |
| 12    | " Champion .. .. .                   | 27-75          | 1-31  |

| Plot. | Variety.                  | Crop per Acre. |       |
|-------|---------------------------|----------------|-------|
|       |                           | Roots.         | Tops. |
|       |                           | Tons.          | Tons. |
| 13    | Sutton's Elephant .. .. . | 28-49          | 2-13  |
| 14    | " Magnum Bonum .. .. .    | 29-97          | 1-50  |
| 15    | Garton's Pioneer .. .. .  | 37-01          | 1-41  |
| 16    | " Model .. .. .           | 31-45          | 1-18  |
| 17    | " Green Tankard .. .. .   | 31-82          | 1-31  |
| 18    | " Perfection .. .. .      | 24-79          | 1-61  |
| 19    | " Cropwell .. .. .        | 27-75          | 1-06  |
| 20    | " Keepwell .. .. .        | 35-89          | 1-36  |
| 21    | " Incomparable .. .. .    | 32-20          | 1-60  |
| 22    | " Superlative .. .. .     | 36-63          | 1-48  |
| 23    | " Victory .. .. .         | 27-75          | 1-55  |

Remarks : A good rain followed the sowing, and the weather was warm with light showers for the early growth of the roots. Heavy rains towards end of December caused the ground to cake. Intercultivation was given.

*Variety Test, conducted by the Canterbury Frozen Meat Company (Limited), Belfast.*

The land selected for the experiment was a clayey loam on a clay subsoil, and was in grass for three years prior to 1910, when it was ploughed up and a potato crop taken. For the experiment it was ploughed on 1st August, 1911, rolled 2nd August, disc- and tine-harrowed 5th August, ploughed 17th August, tine-harrowed 22nd and 30th August, rolled 2nd September, ploughed 15th September, and tine-harrowed 19th September, 1911. Twenty-eight varieties were sown, and were drilled in on the flat in rows 26 in. apart on 27th October, 1911. 2 cwt. per acre of Belfast mangel-manure was applied at time of sowing the seed. The land received thorough cultivation during the growth of the crop. The roots were pulled and weighed on 15th May, 1912. Results :—

| Plot. | Variety.                                | Crop per Acre. |       |
|-------|---|----------------|-------|
|       |   | Roots.         | Tops. |
|       |   | Tons.          | Tons. |
| 1     | Hurst and Son's East Lothian .. .. .    | 54-20          | 8-24  |
| 2     | " Perfection .. .. .                    | 53-02          | 7-65  |
| 3     | " Lord Derby .. .. .                    | 54-20          | 7-07  |
| 4     | " Kangaroo .. .. .                      | 60-09          | 9-42  |
| 5     | " Select Monarch* .. .. .               | 65-99          | 9-42  |
| 6     | " XL All .. .. .                        | 60-09          | 6-48  |
| 7     | " Best of All .. .. .                   | 48-31          | 5-89  |
| 8     | Webb and Son's New Empire .. .. .       | 71-88          | 5-89  |
| 9     | " Giant King .. .. .                    | 60-68          | 7-07  |
| 10    | " Imperial .. .. .                      | 60-68          | 7-65  |
| 11    | " New Buffalo .. .. .                   | 54-79          | 5-89  |
| 12    | Nimmo and Blair's Standard .. .. .      | 45-36          | 5-89  |
| 13    | " John Bull* .. .. .                    | 52-43          | 7-65  |
| 14    | Sutton's Queen .. .. .                  | 53-61          | 3-63  |
| 15    | " Crimson King* .. .. .                 | 68-34          | 7-07  |
| 16    | " Champion .. .. .                      | 63-63          | 7-65  |
| 17    | " Elephant* .. .. .                     | 59-50          | 8-24  |
| 18    | " Magnum Bonum .. .. .                  | 61-27          | 8-24  |
| 19    | Garton's Pioneer* .. .. .               | 51-26          | 6-48  |
| 20    | " Model .. .. .                         | 61-27          | 6-18  |
| 21    | " Green Tankard* .. .. .                | 64-22          | 7-07  |
| 22    | " Perfection .. .. .                    | 61-28          | 6-48  |
| 23    | " Cropwell .. .. .                      | 51-26          | 4-12  |
| 24    | " Keepwell .. .. .                      | 62-45          | 4-71  |
| 25    | " Incomparable .. .. .                  | 63-63          | 7-07  |
| 26    | " Superlative .. .. .                   | 69-52          | 3-82  |
| 27    | " Victory .. .. .                       | 60-09          | 4-71  |
| 28    | Montgomery and Co.'s Skirving's .. .. . | 53-02          | 8-24  |

\* Affected with club-root.



Inspector Hughes reports: Considering the wet and cold season, the experiment must be considered a very satisfactory one. All varieties suffered in a more or less degree in the leaves through being attacked by the green-fly or aphid and diamond-back moth. Varieties sown in plots 5, 13, 15, 17, 19, and 21, were attacked by club-root.

## TIMARU DISTRICT.

*Manurial and Variety Tests, conducted by R. Hammond, Te Moana, Geraldine.*

The land selected was a loam with a stiff clay subsoil, and had been in English grass for four years prior to being broken up on 15th June, 1911, for present experiments. It was cultivated and tine-harrowed twice in September; ploughed, cultivated, harrowed, and rolled in October; thrown into raised ridges on 7th November, 1911. In the manurial test the area was divided into seven manurial plots, and one unmanured as a test plot. Plots one-tenth acre each. The land was uniform in character throughout. The fertilizers applied were according to a formula designed by the Chief Agricultural Chemist. The seed was sown and the fertilizers applied on 16th November, 1911. The variety of seed sown was Sutton's Magnum Bonum. In the variety test 1 cwt. of superphosphate per acre was applied. The land was in good order to receive the seeds, and the sowing was done under favourable conditions. The crop was harvested on 20th May, 1912. Results:—

## MANURIAL TEST.

| Plot. | Manures per Acre.  | Cost per Acre.   | Weight of Crop per Acre. |               | Effect of Manuring.  |
|-------|--|------------------|--------------------------|---------------|----------------------|
|       |  |                  | Roots.                   | Top.          |                      |
| 1     | Superphosphate, $\frac{3}{4}$ cwt. ..                                    | £ s. d.<br>0 3 7 | Tons.<br>18-57           | Tons.<br>1-29 | Tons.<br>Gain, 13-27 |
| 2     | Superphosphate, $1\frac{1}{2}$ cwt. ..                                   | 0 7 2            | 34-08                    | 2-51          | " 28-78              |
| 3     | Superphosphate, 1 cwt.; bone-dust, 42 lb. ..                             | 0 7 0            | 26-94                    | 2-10          | " 21-64              |
| 4     | No manure .. ..  | ..               | 5-30                     | 0-74          | ..                   |
| 5     | Superphosphate, 1 cwt.; bone-dust, 42 lb.; sulphate of potash, 14 lb. .. | 0 8 11           | 26-53                    | 2-51          | Gain, 21-23          |
| 6     | No. 5 mixture, $\frac{3}{4}$ cwt. ..                                     | 0 4 6            | 18-09                    | 2-04          | " 12-79              |
| 7     | No. 5 mixture, $\frac{3}{4}$ cwt.; salt, 7 lb. ..                        | 0 4 8            | 18-77                    | 1-36          | " 13-47              |
| 8     | Albatross guano, 1 cwt. ..   | 0 5 0            | 21-43                    | 2-51          | " 16-13              |

## VARIETY TEST.

| Plot. | Variety.                              | Crop per Acre. |               |
|-------|---------------------------------------|----------------|---------------|
|       |                                       | Roots.         | Top.          |
| 1     | Hurst and Son's East Lothian .. ..    | Tons.<br>19-31 | Tons.<br>1-63 |
| 2     | " Perfection .. ..                    | 24-48          | 2-72          |
| 3     | " Lord Derby .. ..                    | 28-56          | 3-26          |
| 4     | " Kangaroo .. ..                      | 23-66          | 3-26          |
| 5     | " Select Monarch .. ..                | 17-95          | 2-44          |
| 6     | " XL All .. ..                        | 26-93          | 2-44          |
| 7     | " Best of All .. ..                   | 26-93          | 2-44          |
| 8     | Nimmo and Blair's Standard .. ..      | 26-93          | 3-26          |
| 9     | " John Bull .. ..                     | 30-19          | 3-26          |
| 10    | Sutton's Queen .. ..                  | 31-82          | 2-44          |
| 11    | " Crimson King .. ..                  | 35-91          | 3-26          |
| 12    | " Champion .. ..                      | 24-48          | 3-26          |
| 13    | " Elephant .. ..                      | 32-60          | 4-35          |
| 14    | " Magnum Bonum .. ..                  | 28-56          | 4-35          |
| 15    | Garton's Pioneer .. ..                | 33-46          | 3-26          |
| 16    | " Model .. ..                         | 22-03          | 1-36          |
| 17    | " Green Tankard .. ..                 | 21-22          | 3-26          |
| 18    | " Perfection .. ..                    | 35-09          | 2-44          |
| 19    | " Cropwell .. ..                      | 35-09          | 3-26          |
| 20    | " Keepwell .. ..                      | 26-11          | 4-35          |
| 21    | " Incomparable .. ..                  | 35-09          | 5-16          |
| 22    | " Superlative .. ..                   | 34-27          | 3-26          |
| 23    | " Victory .. ..                       | 27-74          | 3-26          |
| 24    | Montgomery and Co.'s Skirving's .. .. | 35-09          | 8-16          |

## FAIRLIE DISTRICT.

*Variety Test, conducted by W. J. Geddings, Fairlie.*

The land selected for the experiment was a sandy loam on a shingly subsoil, and was uniform in character. Prior to the experiment the land was in grass for a number of years, and was broken up for present experiment in August, 1911, and disced and grubbed the same month; tine-harrowed and Cambridge-rolled in November, 1911. The seeds were sown in raised drills on 20th November, 1911, the drills being 26 in. apart. 2 cwt. per acre of superphosphate was applied as a fertilizer. The test was initiated under favourable weather-conditions, and the land was in good order. Inter-cultivation was given and the plants thinned out to about 9 in. between the rows. The crop was harvested on 30th June, 1912. Results :—

| Plot. | Variety.                                | Crop per Acre. |            |
|-------|---|----------------|------------|
|       |   | Roots.         | Tops.      |
| 1     | Hurst and Son's East Lothian .. .. .    | Tons. 22-85    | Tons. 2-04 |
| 2     | " Perfection .. .. .                    | 21-62          | 1-63       |
| 3     | " Lord Derby .. .. .                    | 20-45          | 2-45       |
| 4     | " Kangaroo .. .. .                      | 18-32          | 1-63       |
| 5     | " Select Monarch .. .. .                | 17-50          | 1-21       |
| 6     | " XL All .. .. .                        | 22-40          | 2-45       |
| 7     | " Best of All .. .. .                   | 20-45          | 2-45       |
| 8     | Nimmo and Blair's Standard .. .. .      | 21-22          | 1-63       |
| 9     | " John Bull .. .. .                     | 20-40          | 3-30       |
| 10    | Sutton's Queen .. .. .                  | 23-26          | 2-04       |
| 11    | " Crimson King .. .. .                  | 19-12          | 2-85       |
| 12    | " Champion .. .. .                      | 19-54          | 1-21       |
| 13    | " Elephant .. .. .                      | 20-40          | 2-45       |
| 14    | " Magnum Bonum .. .. .                  | 21-62          | 2-04       |
| 15    | Garton's Pioneer .. .. .                | 20-45          | 1-63       |
| 16    | " Model .. .. .                         | 23-66          | 3-30       |
| 17    | " Green Tankard .. .. .                 | 19-99          | 2-04       |
| 18    | " Perfection .. .. .                    | 21-62          | 1-63       |
| 19    | " Cropwell .. .. .                      | 16-73          | 2-04       |
| 20    | " Keepwell .. .. .                      | 15-50          | 1-21       |
| 21    | " Incomparable .. .. .                  | 12-65          | 0-81       |
| 22    | " Superlative .. .. .                   | 15-46          | 0-40       |
| 23    | " Victory .. .. .                       | 13-87          | 1-21       |
| 24    | Montgomery and Co.'s Skirving's .. .. . | 14-28          | 1-63       |

Inspector Manning reports : Immediately after sowing wet weather set in, and continued for some weeks cold and unfavourable for root crops. Somewhat similar weather-conditions were experienced from 1st January to date of harvesting. Considerable damage was done to the young plants in the early stages by the grub. A careful examination of the roots was made at date of harvesting, but no signs of club-root or other diseases were observable.

## KUROW DISTRICT.

*Manurial Test, conducted by E. O'Neil, Otekaikai.*

The land selected for the experiment was a light free loam on a stony bottom, and was uniform in character. It was in English grass for four years prior to 1910, when it was broken up and a crop of oats taken in 1911. For the present experiment it was ploughed on 4th July, 1911; cultivated 6 in. deep, and tine-harrowed (seven strokes) during first week in October, 1911. The area was divided into seven manurial plots, and one unmanured as a test plot. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Sutton's Magnum Bonum. The seeds and fertilizers were sown in raised drills on 8th October.

1911; drills 30 in. wide. The roots were pulled and weighed on 15th May, 1912. Results:—

| Plot. | Manures per Acre.   | Cost per Acre. | Weight of Crop per Acre. |       | Effect of Manuring. |
|-------|---|----------------|--------------------------|-------|---------------------|
|       |   |                | Roots.                   | Tops. |                     |
|       |   | £ s. d.        | Tons.                    | Tons. | Tons.               |
| 1     | Superphosphate, $1\frac{1}{2}$ cwt. ..  | 0 7 2          | 15.29                    | 1.81  | Gain, 3.11          |
| 2     | Superphosphate, 3 cwt. ..   | 0 14 4         | 14.00                    | 1.55  | " 1.82              |
| 3     | Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt. ..                      | 0 14 0         | 12.96                    | 1.42  | " 0.78              |
| 4     | No manure ..  | ..             | 12.18                    | 1.29  | ..                  |
| 5     | No. 3 mixture, $2\frac{3}{4}$ cwt.; sulphate of potash, $\frac{1}{4}$ cwt. .. | 0 17 10        | 14.26                    | 1.42  | Gain, 2.08          |
| 6     | No. 5 mixture, $1\frac{1}{2}$ cwt. ..   | 0 8 11         | 16.85                    | 2.07  | " 4.67              |
| 7     | No. 6 mixture, $1\frac{1}{2}$ cwt.; salt, 14 lb. ..                           | 0 9 3          | 10.63                    | 1.16  | Loss, 1.55          |
| 8     | Albatross guano, 2 cwt. ..  | 0 10 0         | 14.26                    | 1.29  | Gain, 2.08          |

Inspector Reid reports: There was a good strike in all plots. Wet and cold weather prevailed during the months of November and December, consequently intercultivation could not be given; weeds therefore got away and did much harm to the crop. The crop was free from disease.

#### WAIMATE DISTRICT.

*Variety Test, conducted by George Reynolds, Willowbridge.*

The land selected for the experiment was a sandy loam on a clay subsoil. It was in oats and sown out with grass in 1907; in grass 1908 and 1909; in turnips 1910; and ploughed and tine-harrowed for present experiment on 20th October, 1911. It was rolled, ploughed, tine-harrowed, disc-harrowed, Cambridge-rolled and tine-harrowed during the first half of November, 1911. The seed was sown in raised drills on 17th November, 1911; drills 28 in. apart. 1 cwt. superphosphate per acre was applied. The test was carried out under favourable conditions. Intercultivation was given during the early growth of the crop. The roots were pulled and weighed on 30th May, 1912. Results:—

| Plot. | Variety.                           | Crop per Acre. |       |
|-------|------------------------------------|----------------|-------|
|       |                                    | Roots.         | Tops. |
|       |                                    | Tons.          | Tons. |
| 1     | Hurst and Son's East Lothian ..    | 11.60          | 1.25  |
| 2     | " Perfection ..                    | 20.00          | 2.14  |
| 3     | " Lord Derby ..                    | 20.89          | 3.21  |
| 4     | " Kangaroo ..                      | 20.17          | 2.67  |
| 5     | " Select Monarch* ..               | 20.35          | 2.32  |
| 6     | " XL All ..                        | 19.64          | 1.96  |
| 7     | " Best of All ..                   | 22.32          | 2.50  |
| 8     | Nimmo and Blair's Standard ..      | 17.85          | 2.67  |
| 9     | " John Bull ..                     | 20.53          | 3.75  |
| 10    | Sutton's Queen ..                  | 17.32          | 1.25  |
| 11    | " Crimson King* ..                 | 19.10          | 2.14  |
| 12    | " Champion ..                      | 21.42          | 2.32  |
| 13    | " Elephant* ..                     | 20.17          | 2.85  |
| 14    | " Magnum Bonum ..                  | 20.89          | 2.32  |
| 15    | Garton's Pioneer ..                | 18.21          | 2.14  |
| 16    | " Model ..                         | 18.21          | 1.25  |
| 17    | " Green Tankard ..                 | 19.64          | 2.85  |
| 18    | " Perfection ..                    | 20.17          | 2.14  |
| 19    | " Cropwell ..                      | 21.25          | 2.32  |
| 20    | " Keepwell ..                      | 25.00          | 3.39  |
| 21    | " Incomparable ..                  | 30.35          | 4.82  |
| 22    | " Superlative ..                   | 20.00          | 1.25  |
| 23    | " Victory ..                       | 16.25          | 1.25  |
| 24    | Montgomery and Co.'s Skirving's .. | 19.64          | 3.39  |

\* Slightly affected with club-root.

Inspector Macdonald reports: The season during growth was particularly wet. The following varieties showed club-root, but not to any extent: Select Monarch, Crimson King, and Elephant.

## OAMARU DISTRICT.

*Variety Test, conducted by James B. Taylor, Springbank Estate, Kokoamo.*

The land selected for the experiment was a friable black soil with a clay subsoil. It was in grass for five years prior to being broken up and a crop of wheat taken in 1910. For the present experiment it was ploughed in March, 1911; grubbed in August; grubbed and tine-harrowed at beginning of November; thrown into raised drills and seed sown on 7th November, 1911. No fertilizers were used. The crop was harvested on 31st May, 1912. Results:—

| Plot. | Variety.                                | Crop per Acre. |       |
|-------|---|----------------|-------|
|       |   | Roots.         | Tops. |
|       |   | Tons.          | Tons. |
| 1     | Hurst and Son's East Lothian .. .. .    | 6.48           | ..    |
| 2     | " Perfection .. .. .                    | 7.56           | ..    |
| 3     | " Lord Derby .. .. .                    | 8.10           | ..    |
| 4     | " Kangaroo .. .. .                      | 8.64           | ..    |
| 5     | " Select Monarch .. .. .                | 9.72           | ..    |
| 6     | " XL All .. .. .                        | 9.18           | ..    |
| 7     | " Best of All .. .. .                   | 7.56           | ..    |
| 8     | Webb and Son's New Empire .. .. .       | 9.72           | ..    |
| 9     | " Giant King .. .. .                    | 8.64           | ..    |
| 10    | " Imperial .. .. .                      | 10.26          | ..    |
| 11    | " Buffalo .. .. .                       | 9.72           | ..    |
| 12    | Nimmo and Blair's Standard .. .. .      | 8.10           | ..    |
| 13    | " John Bull .. .. .                     | 9.18           | ..    |
| 14    | Sutton's Queen .. .. .                  | 10.26          | ..    |
| 15    | " Crimson King .. .. .                  | 8.10           | ..    |
| 16    | " Champion .. .. .                      | 9.18           | ..    |
| 17    | " Elephant .. .. .                      | 9.45           | ..    |
| 18    | " Magnum Bonum .. .. .                  | 8.10           | ..    |
| 19    | Garton's Pioneer .. .. .                | 9.18           | ..    |
| 20    | " Model .. .. .                         | 10.26          | ..    |
| 21    | " Green Tankard .. .. .                 | 8.64           | ..    |
| 22    | " Perfection .. .. .                    | 9.72           | ..    |
| 23    | " Cropwell .. .. .                      | 9.18           | ..    |
| 24    | " Keepwell .. .. .                      | 9.45           | ..    |
| 25    | " Incomparable .. .. .                  | 7.56           | ..    |
| 26    | " Superlative .. .. .                   | 8.64           | ..    |
| 27    | Montgomery and Co.'s Skirving's .. .. . | 8.10           | ..    |

Tops not weighed.

Inspector Taylor reports: The season was too wet and cold, the crop was therefore a poor one. The roots were healthy.

*Manurial and Variety Test, conducted at Waitaki Boys' High School, Oamaru.*

The soil in the experimental area was a light clay with a clay subsoil, and had been cropped out. It was in grass for some years prior to 1910, when it was ploughed up and a crop of potatoes taken. For present experiment it was ploughed in August, 1911; disc- and tine-harrowed twice in September; grubbed and hoed 13th October, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-twentieth acre each. The fertilizers applied were according to a formula designed by the Chief Agricultural Chemist. The soil in the plots was uniform in character. The variety of seed sown was Sutton's Magnum Bonum. The seeds and fertilizers were sown in raised drills on 14th November, 1911; drills 28 in. apart. In the variety test no fertilizers were used. The crop was harvested on 15th May, 1912. Results:—

## MANURIAL TEST.

| Plot. | Manures per Acre.   | Cost per Acre. | Weight of Crop per Acre. |            | Effect of Manuring. |
|-------|---|----------------|--------------------------|------------|---------------------|
|       |   |                | Roots.                   | Tops.      |                     |
| 1     | Superphosphate, $1\frac{1}{2}$ cwt. ..                      | £ 0 7 2        | Tons. 43·21              | Tons. 5·40 | Tons. Gain, 23·77   |
| 2     | Superphosphate, 3 cwt. ..                                   | 0 14 4         | 31·87                    | 4·32       | " 12·43             |
| 3     | Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt. ..    | 0 14 0         | 32·42                    | 4·32       | " 12·98             |
| 4     | No manure ..  | .. ..          | 19·44                    | 2·16       | .. ..               |
| 5     | No. 3 mixture and sulphate of potash, $\frac{1}{2}$ cwt. .. | 0 17 10        | 31·87                    | 2·70       | Gain, 12·43         |
| 6     | No. 5 mixture, $1\frac{1}{2}$ cwt. ..                       | 0 8 11         | 31·87                    | 2·70       | " 12·43             |
| 7     | No. 6 mixture and salt, 14 lb. ..                           | 0 9 3          | 27·00                    | 4·32       | " 7·56              |
| 8     | Albatross guano, 2 cwt. ..                                  | 0 10 0         | 29·16                    | 3·24       | " 9·72              |

## VARIETY TEST.

| Plot. | Variety.                           | Crop per Acre. |            |
|-------|------------------------------------|----------------|------------|
|       |                                    | Roots.         | Tops.      |
| 1     | Hurst and Son's East Lothian ..    | Tons. 30·80    | Tons. 5·94 |
| 2     | " Perfection ..                    | 28·08          | 5·94       |
| 3     | " Lord Derby ..                    | 34·57          | 6·48       |
| 4     | " Kangaroo ..                      | 28·08          | 5·40       |
| 5     | " Select Monarch ..                | 34·57          | 7·02       |
| 6     | " XL All ..                        | 35·65          | 7·02       |
| 7     | " Best of All ..                   | 33·49          | 7·02       |
| 8     | Nimmo and Blair's Standard ..      | 34·57          | 7·56       |
| 9     | " John Bull ..                     | 33·49          | 7·02       |
| 10    | Sutton's Queen ..                  | 26·46          | 6·48       |
| 11    | " Crimson King ..                  | 27·00          | 5·94       |
| 12    | " Champion ..                      | 29·16          | 5·94       |
| 13    | " Elephant ..                      | 28·08          | 5·40       |
| 14    | " Magnum Bonum ..                  | 28·08          | 5·40       |
| 15    | Garton's Model ..                  | 26·46          | 4·86       |
| 16    | " Green Tankard ..                 | 27·00          | 5·40       |
| 17    | " Perfection ..                    | 29·16          | 5·94       |
| 18    | " Cropwell ..                      | 34·57          | 7·02       |
| 19    | " Keepwell ..                      | 31·87          | 9·18       |
| 20    | " Incomparable ..                  | 25·40          | 8·10       |
| 21    | " Victory ..                       | 29·16          | 7·02       |
| 22    | Montgomery and Co.'s Skirving's .. | 29·70          | 8·10       |

Inspector Taylor reports: The sowing of both the manurial and variety tests was carried out under favourable conditions. Cold and wet weather followed. The leaves were slightly attacked by the diamond-back moth. The fungoid disease club-root was prevalent throughout all varieties. I have endeavoured to find out if this disease was observed in any of the cruciferous plants grown on this land previously, but as the section has changed hands several times no reliable data is available. I feel confident, however, the spores must have been in the portion where the swedes were grown, as all varieties were badly affected. In other experiments conducted in this district, and similar seeds were used, there was no appearance of club-root in any of the crops.

## PALMERSTON SOUTH DISTRICT.

*Manurial and Variety Test, conducted by A. D. Gillies, Hampden.*

The land selected was a clayey loam with a slight gravelly subsoil, and had been in grass for three years prior to being ploughed up and a crop of oats taken in 1911. For the present experiment it was cultivated in March, 1911; ploughed 9 in. deep in May; tine-harrowed twice in September; cultivated and tine-harrowed twice in October, 1911. The seed and fertilizers were sown in raised drills on 28th October, 1911. In



the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Sutton's Magnum Bonum. The soil in the plots was uniform in character. In the variety test 2 cwt. of Argyll guano was applied per acre. The roots were pulled and weighed on 18th June, 1912. Results:—

## MANURIAL TEST.

| Plot. | Manures per Acre.                               | Cost per Acre. | Weight of Crop per Acre. |       | Effect of Manuring. |
|-------|---|----------------|--------------------------|-------|---------------------|
|       |   |                | Roots.                   | Tops. |                     |
|       |   | £ s. d.        | Tons.                    | Tons. | Tons.               |
| 1     | Superphosphate, 1½ cwt. ..                      | 0 7 2          | 22.50                    | 1.17  | Gain, 16.48         |
| 2     | Superphosphate, 3 cwt. ..                       | 0 14 4         | 30.87                    | 1.57  | 24.85               |
| 3     | Superphosphate, 2 cwt.; bone-dust, ½ cwt. ..    | 0 14 0         | 32.44                    | 2.09  | 26.42               |
| 4     | No manure ..                                    | ..             | 06.02                    | ..    | ..                  |
| 5     | No. 3 mixture and sulphate of potash, ½ cwt. .. | 0 17 10        | 26.68                    | 2.35  | Gain, 20.66         |
| 6     | No. 5 mixture, 1½ cwt. ..                       | 0 8 11         | 28.77                    | 2.61  | 22.75               |
| 7     | No. 6 mixture and salt, 14 lb. ..               | 0 9 3          | 23.54                    | 2.09  | 17.52               |
| 8     | Albatross guano, 2 cwt. ..                      | 0 10 0         | 21.45                    | 2.88  | 15.43               |

## VARIETY TEST.

| Plot. | Variety.                           | Crop per Acre. |       |
|-------|------------------------------------|----------------|-------|
|       |                                    | Roots.         | Tops. |
|       |                                    | Tons.          | Tons. |
| 1     | Hurst and Son's East Lothian ..    | 29.82          | 1.57  |
| 2     | " Perfection ..                    | 30.60          | 2.09  |
| 3     | " Lord Derby ..                    | 31.39          | 1.57  |
| 4     | " Kangaroo ..                      | 29.29          | 2.09  |
| 5     | " Select Monarch ..                | 28.25          | 2.09  |
| 6     | " XL All ..                        | 25.11          | 1.04  |
| 7     | " Best of All ..                   | 26.19          | 1.04  |
| 8     | Webb and Son's New Empire ..       | 20.95          | 1.04  |
| 9     | " Giant King ..                    | 25.11          | 1.57  |
| 10    | " Imperial ..                      | 34.04          | 2.09  |
| 11    | " New Buffalo ..                   | 24.07          | 1.57  |
| 12    | Nimmo and Blair's Standard ..      | 30.87          | 1.83  |
| 13    | " John Bull ..                     | 23.02          | 1.83  |
| 14    | Sutton's Queen ..                  | 19.62          | 1.04  |
| 15    | " Crimson King ..                  | 28.25          | 1.30  |
| 16    | " Champion ..                      | 24.85          | 1.57  |
| 17    | " Elephant ..                      | 23.54          | 1.30  |
| 18    | " Magnum Bonum ..                  | 22.50          | 1.04  |
| 19    | Garton's Pioneer ..                | 24.06          | 1.30  |
| 20    | " Model ..                         | 32.70          | 1.30  |
| 21    | " Green Tankard ..                 | 23.02          | 1.57  |
| 22    | " Perfection ..                    | 30.34          | 1.57  |
| 23    | " Cropwell ..                      | 31.39          | 1.83  |
| 24    | " Keepwell ..                      | 25.11          | 1.30  |
| 25    | " Incomparable ..                  | 20.40          | 1.30  |
| 26    | " Superlative ..                   | 19.88          | 0.78  |
| 27    | " Victory ..                       | 17.52          | 1.04  |
| 28    | Montgomery and Co.'s Skirving's .. | 18.83          | 2.09  |

Inspector Dalglish reports: The weather-conditions were unfavourable. The experimental area was on flat land, and owing to continuous wet weather the water lay for a considerable time on it. No club-root disease was noticeable, but black-rot affected varieties sown in plots 1, 7, 8, 9, 10, 14, 17, 18, 19, 20, 21, 22, 25, and 26.

*Variety Test, conducted by John Douglas's Trustees, Mount Royal, Palmerston South.*

The land selected was a clayey loam on a clay and gravelly subsoil, and was uniform in character. It had been in grass for some years before being ploughed and sown in oats, 1910. In oats, 1911, and fed off. For the present experiment it was ploughed 6 in. deep; disced three times; tine-harrowed twice and Cambridge-rolled in November, 1911. The seeds were sown and  $2\frac{1}{2}$  cwt. of Criterion turnip-manure applied in raised drills on 1st December, 1911. The crop was harvested on 27th May, 1912. Results:—

| Plot. | Variety.                                | Crop per Acre. |       |
|-------|---|----------------|-------|
|       |   | Roots.         | Tops. |
|       |   | Tons.          | Tons. |
| 1     | Hurst and Son's East Lothian .. .. .    | 26-11          | 5-16  |
| 2     | " Perfection* .. .. .                   | 23-94          | 4-62  |
| 3     | " Lord Derby .. .. .                    | 16-59          | 3-53  |
| 4     | " Kangaroo* .. .. .                     | 22-03          | 4-03  |
| 5     | " Select Monarch* .. .. .               | 26-66          | 4-35  |
| 6     | " XL All .. .. .                        | 13-60          | 2-17  |
| 7     | " Best of All .. .. .                   | 19-04          | 3-53  |
| 8     | Webb and Son's New Empire* .. .. .      | 19-04          | 2-44  |
| 9     | " Giant King* .. .. .                   | 19-04          | 3-26  |
| 10    | " Imperial .. .. .                      | 20-40          | 3-53  |
| 11    | " New Buffalo .. .. .                   | 18-77          | 3-80  |
| 12    | Nimmo and Blair's Standard .. .. .      | 10-61          | 2-44  |
| 13    | " John Bull .. .. .                     | 20-94          | 4-35  |
| 14    | Sutton's Queen* .. .. .                 | 15-23          | 1-90  |
| 15    | " Crimson King* .. .. .                 | 17-95          | 2-72  |
| 16    | " Champion .. .. .                      | 17-41          | 2-44  |
| 17    | " Elephant* .. .. .                     | 22-30          | 3-53  |
| 18    | " Magnum Bonum* .. .. .                 | 20-40          | 3-26  |
| 19    | Garton's Pioneer .. .. .                | 17-95          | 2-99  |
| 20    | " Model .. .. .                         | 23-94          | 2-44  |
| 21    | " Green Tankard .. .. .                 | 18-50          | 3-53  |
| 22    | " Perfection .. .. .                    | 18-50          | 2-44  |
| 23    | " Cropwell .. .. .                      | 12-51          | 2-17  |
| 24    | " Keepwell .. .. .                      | 19-86          | 3-53  |
| 25    | " Incomparable .. .. .                  | 16-86          | 3-26  |
| 26    | " Superlative .. .. .                   | 20-67          | 2-44  |
| 27    | " Victory .. .. .                       | 09-25          | 1-08  |
| 28    | Montgomery and Co.'s Skirving's .. .. . | 14-41          | 3-53  |

\* Affected with club-root.

Inspector Dalglish reports: The weather-conditions were unfavourable during period of growth. Plots 3, 4, and 5 suffered from the grub. Club-root affected nine varieties, the varieties sown in plots 3, 4, and 5 being more badly affected than the others.

Reference is made in the British Board of Trade Journal to a new artificial manure which is being manufactured in Norway. The new manure, which contains 26 per cent. of phosphoric acid and 23·8 per cent. of nitrate of lime, is a by-product formed in the course of the manufacture of nitrate of lime. The fertilizer, which should prove of value because of its phosphorus and nitrogen contents, is not yet on the market, but it is stated it can be produced at a low price.

## PASTURES AND CROPS.

## OCTOBER.

OFFICERS of the Fields and Experimental Farms Division of the Department report as follows on the condition of the pastures and crops during the past month:—

**BAY OF ISLANDS.**—The weather for October was extremely variable, from cold westerly gales and bitter showers to fine, clear, steady tropical-like sunshine. Up to the 29th 2.59 in. of rain fell, the heaviest fall being on the 6th, when 0.93 in. saturated the porous volcanic soil of Ohaeawai. New potatoes are now in. The country generally is looking well, also stock. Shearing is now nearing completion.—*W. J. Dunlop.*

**WHANGAREI.**—The month was dry, there being about 2 in. of rainfall—mostly cold squally showers—from the 16th onward, which to a certain extent checked growth of grass. All grain crops are looking well, and there is practically no sign of blight on potatoes in the lower north. The take of spring sowing of grass-seed has been good.—*A. P. Speedy.*

**AUCKLAND.**—The varied, cold, and boisterous weather of last month had a very bad effect upon the pasture country, leaving the paddocks bare of feed and the land generally in a sodden state. However, towards the end of the month warmer and milder weather set in, which will improve the condition of things ere long. Crops are looking very promising, particularly potatoes, the usual precautions being taken to spray them. Early potatoes are finding their way into the market, selling at a price satisfactory to the grower. Considering the rough weather, stock of all descriptions are looking well. Shearing has commenced, and an excellent lambing is reported on both the high and low country. The general prospects of the dairying industry never looked brighter, every factory being in full swing. The milk coming to the factories is arriving in splendid condition. The settlers are paying better attention to their dairy herds by testing and weeding out unprofitable cows.—*R. Rowan.*

**HAMILTON.**—During the month of October the weather was changeable, varying from mild showery rains to cold boisterous weather, with heavy rains and hailstorms. Farming operations are backward for this season of the year, but farmers have taken advantage of the few fine days to cultivate the higher lands. Stock are looking remarkably well, especially the dairy herds, the animals being in splendid condition.—*J. Kerr.*

**KING-COUNTRY.**—The weather during October was of a mixed nature, but on the whole was a decided improvement on that experienced in September. The latter portion of the month was fine, the warm days being beneficial to pastures and green crops. Farmers are busy preparing the land for root crops.—*B. Bayly.*

**BAY OF PLENTY.**—The weather during the past month was more favourable, and farmers are now busy planting maize. Pastures throughout the district are looking well, and the dairy factories are now in full swing.—*J. Case.*

**TE AWAMUTU.**—October was a fairly good month, though rather much rain, and too much cold wind to allow pastures and crops to be what they ought to be at this time of the year. Stock in general are looking well, and shearing is starting in many places. Farm-work is backward owing partly to great scarcity of suitable labour, but if fine weather continues a good season will ensue for the dairymen.—*C. E. McPhee.*

**TAUMARUNUI.**—October was a very wet month, rain falling on twenty-two days, but owing to the mildness of the weather crops have come away very well. Nights were cold, with slight frosts, but not severe enough to do any damage. Roads are almost impassable. Fair lambing averages have been obtained throughout the district. Dairying is now in full swing, and there is every indication for a successful season.—*E. T. Hughes.*

**OHAKUNE.**—From an agricultural and pastoral point of view the weather experienced over the greater part of the month was anything but satisfactory, par-

ticularly so to the agriculturist, the heavy and continuous rains prohibiting the working of areas undergoing cultivation. Docking operations have been retarded, but on holdings where completed 90 to 120 per cent. of lambs have been obtained, the latter percentage being confined to the smaller holdings where it has been possible to give every attention at lambing-time. Pastures, although presenting a favourable appearance, are lacking in quality.—*P. Barry.*

POVERTY BAY.—The weather during October was very favourable for the growth of pastures and crops. A good deal of rain fell, and this, with the mild weather, has produced good results on grass and crops. Some of the earlier-sown maize is coming away well. Stock generally are in good condition.—*W. Ross.*

STRATFORD.—A good growing month that has brought on the feed well. We had a very cold snap on the 24th, 25th, and 26th, accompanied by hail and frost, which had the effect of decreasing the milk-supply for that period, but, taking the country generally, it is looking very well, and the prospects are very bright for farmers.—*Austin F. Wilson.*

HAWERA.—Except on the 26th, when a very cold southerly gale was experienced, October weather was, for these dairying districts, everything that could be desired. Frequent rainfalls, with warm sunny days intervening, promoted rapid growth in pastures. The milk-yield largely increased during the month, and the prospects for the dairying season are at present exceedingly bright.—*A. J. Glasson.*

WANGANUI.—Reasonably fine weather obtained during the first ten days of October—a welcome improvement on that experienced during the previous month. The last five days were excellent. From the 11th to the 26th inclusive the climatic conditions were, on the whole, execrable, being cold and squally, with heavy storms at intervals and occasional thunder. A deluge of rain and hail fell all night on the 25th, and was followed by a gale of exceptional violence. Pastures favoured by the relatively fine weather of the early and latter parts of the month, and by the lengthening days, have grown freely, and now generally supply a good quantity of feed. Grain crops are looking well.—*C. Watson.*

MANGAWEKA.—The weather during October eclipsed all past months for rain. The continuous wet has done a great deal of harm, causing slips, and suspending all ploughing and garden-work. Grass looks well, but is soft—more sunshine is needed. A heavy fall of snow occurred during the month, making the seventh fall for the season—something unusual for the North Island. High prices are being obtained for cattle and sheep. Dairy factories are now in full swing, and cows are milking well. Shearing has commenced in a good many places, but the wet weather is checking the work considerably.—*J. A. Melrose.*

FEILDING.—The weather during October was disappointing in the extreme, cropping and tillage operations being stopped in the meantime as a result. We experienced a severe storm accompanied by a heavy fall of snow on the 26th instant, young calves and dairy cows feeling the pinch severely. Although some feed has grown there seems to be very little substance in it, owing principally to the lack of sunshine. The intake at the factories is practically at a standstill. If I may suggest to farmers to prepare the land and plant maize up to the middle of December, using artificial manure, the crop would come in useful for green feed or could be made into ensilage later.—*William Dibble.*

WAIROA.—The weather last month was springlike indeed, the flush of growth being so luxurious that the country has an appearance one expects only in more tropical climes. The live-stock are in splendid order, and the lamb-production very much above the average of former years.—*T. F. Mullaly.*

WAIPIKURAU.—The weather was very changeable during last month, the first portion being very warm, while latterly cold rains with hail and snow was the order. Newly shorn sheep would suffer considerably.—*H. O. M. Christie.*

PAHIATUA.—We have again experienced a lot of boisterous weather, the rainfall for the month being 6.34 in. with one day to go. Rain fell on sixteen days, the maximum fall being 1.34 in. on the 15th. Rainfall for October, 1911, 5.48 in. Docking is not yet completed owing to the bad weather. Shearing is also being delayed through the same cause. Cereals and grasses are, however, making good growth, and would especially be so if we could get a few warm and sunny days.—*T. Bacon.*

NORTH WAIRARAPA.—The beginning of the past month and up to the 24th was good growing weather, but towards the end we had a touch of winter, with snow on the low country and cold bitter winds, which stayed all growth, and was particularly rough on

newly shorn ewes. Notwithstanding, the country is looking well, and there is abundance of feed. I observe the grass-grub in different parts of the district working away amongst the grain crops. My experience is that the harder the ground is rolled the less liable are the grubs to spread and destroy grain.—*J. S. Rankin.*

MASTERTON.—There was very fair spring weather during the first part of the month, then high winds were experienced which retarded the growth of grass; but, generally speaking, the pastures look very well. Crops are not looking as well as they should. During the last week we experienced very rough weather—wind, rain, and hail—and on the 26th instant we had snow fairly low down. This rough weather has caused a heavy mortality among newly shorn sheep, and orchards have in many instances suffered severely.—*T. C. Webb.*

SOUTH WAIRARAPA.—During the month of October the weather on the whole was favourable. On the 26th a blizzard came from the south, at times blowing with hurricane force. Stock suffered severely through the storm. Snow fell down to the lower levels, which is unusual at this time of the year. In most cases farmers have had an exceptionally good lambing. Oat crops are looking well, and feed is plentiful. Shearing in many cases is in full swing.—*S. C. Ivens.*

WELLINGTON.—Few fine warm days were enjoyed during October; a succession of strong gales with frequent cold rains generally prevailed. A fierce southerly blizzard, bringing snow on the higher country, raged on the 26th, damaging fruit-trees and crops, and causing considerable loss amongst newly shorn sheep.—*G. H. Jenkinson.*

BLLENHEIM.—The weather during the month was most changeable—one day warm and fine and the next cold and wet. Consequently shearing has been much interfered with. On the 22nd there was a decided change to winter, rain setting in with bitterly cold winds and snow on the high country. This was followed by two days of strong cold winds, and then rain and more snow, finally culminating on the night of the 26th with 9 degrees of frost and 6 degrees the following night, after which there was a change to more reasonable weather. The potato crops have suffered severely from the frosts, some being quite ruined and others considerably set back. Orchards, gardens, and, in some instances, pastures have also suffered badly, but with fair weather onward some recovery may be anticipated.—*F. H. Brittain.*

AWATERE.—The month of October came in with heavy north-westerly gales, which continued for a week without cessation. On the 8th a welcome rain started, which was badly needed, as the country was beginning to show the effects of the high winds. Thence fine spring weather continued, with occasional showers, up to the 21st, when a complete change took place, heavy rain with snow falling in high country, finishing off on the 26th with one of the worst storms that has been recorded here. As the lambing has just started in the Upper Awatere, the rough weather will have caused a big death-rate.—*E. T. Sinclair.*

KAIKOURA.—Pastures during the month made good growth, and there is now plenty of feed about. Grain crops are coming on well, and there is every prospect of a good harvest. Farmers are busy at present working up their land for root crops. Early potatoes are doing first class, no late frosts having occurred so far to interfere with them. The growing of lucerne is being steadily adopted by farmers in this district, and good results have been obtained in the majority of cases. An extremely cold day with south-west rain and snow occurred on the 26th, and a few newly shorn sheep perished. The weather during the rest of the month was mild.—*W. S. Goodall.*

NELSON.—The pastures made fair growth during the month, and there is plenty of feed for stock. The weather was rather dry with a good many strong winds which dried the surface of the ground and made it too hard. On the 22nd there was a thunder-storm, and on the 25th and 26th rain fell for a time on the low and snow on the high elevations. The wind was bitterly cold on the 26th, and was followed by a heavy frost which did a considerable amount of damage to tomatoes, potatoes, and beans in some localities. The grain crops are fair, but want a nice warm rain to soften the surface of the ground.—*Gilbert Ward.*

ROTHERHAM.—The weather for the month of October upon the whole was most suitable for all kinds of farming operations, there being a fair amount of rain and not much of the north-westerly winds usually experienced during October. On the 26th we had a terrific south-westerly storm which raged all day, and which was as cold as any day during the past winter. This must have been very disastrous to newly shorn sheep. October was a fairly wet month. Rain fell on twelve days, with a total fall of 2.38 in. The lambing throughout this district is very promising, and some big percentages have been recorded, while the prices for this season have every indication of



being very high: A good many flockowners have already sold their lambs at big prices. Feed is plentiful throughout the district, and farmers and pastoralists have every promise of a prosperous season.—*W. M. Munro.*

RANGIORA.—Westerly winds were very prevalent last month, with an occasional easterly wind. An exceptional southerly blizzard occurred on the 26th, but of short duration. On that morning the temperature between 8 a.m. and 10 a.m. was within 1 degree of freezing-point. Rainfall for the month, 2.73 in. Total sunshine for the month, 172 hours 32 minutes. There have not been any frosts this month. Some heavy rains have caused the creeks to rise, and delayed farm-work. The percentage of lambs is very good, and I have not heard of much mortality amongst them.—*A. Hughes.*

LINCOLN.—The weather during the early part of October was dry, and during the latter part cold and wet. By this time, fortunately, most of the lambing on the low country was over. Shorn sheep, however, suffered, and on the lake flats a serious loss of ewes and lambs by drowning took place. On the heavier class of lands cultivation and sowing were much hindered owing to the sodden state of the ground. As a result, oats and peas in some localities still remain to be sown. Grass is very plentiful, but soft. Warm weather would now be very welcome.—*J. G. Scott.*

ASHBURTON.—The weather-conditions for the month were very varied—fine weather for the beginning and then from the 17th to the 24th one of the worst blizzards experienced in October for many years. The rainfall totalled 5.54 in. In the back country where lambing was in progress snow fell to the depth of 9 in., and the mortality of lambs was very great. There has also been a heavy mortality of ewes on the low country owing to the extraordinary flush of feed, whilst a good few newly shorn sheep succumbed to the wet weather. Keas are reported to have killed on one station close on three hundred ewes during the winter. I have only seen an odd grass-grub beetle flying so far this season.—*C. Branigan.*

FAIRLIE.—Crops and pastures made good growth during the month. There was a good deal of rain, and 3 in. of snow fell on the 17th., which did a lot of damage in the Mackenzie country, where lambing is in full swing. A good many lambs were lost on the low country. Shearing has now commenced; the clip will be much smaller than in former years owing to the big shortage of sheep.—*W. B. Manning.*

TIMARU.—During the month the weather was very broken, there being heavy showers of rain and a light fall of snow on the hills. All the early crops on the down country are looking well and promise a good return, while there is an abundant growth of grass all through the district.—*J. C. Huddleston.*

WAIMATE.—The weather during October was of a very mixed character, some beautiful spring days being intermixed with cold rains and snow on the higher levels. The rainfall on the 15th and 16th was exceedingly heavy, and during this period losses of lambs were experienced on the more exposed country. The general appearance, however, is that the lambing percentage will be good. Damage from the grass-grub is noticeable on the drier lands. Pastures and grass are exceptionally good, and crops are growing apace, the appearance of the district at the close of the month being most encouraging to those on the land. The planting of potatoes has been hindered somewhat by the unfavourable weather for this work, but present indications are that this season again a considerable area is being put in.—*F. A. Macdonald.*

KUROW.—We have had very mixed weather during the past month, commencing with strong north-west winds up till the 16th, when heavy rain fell, followed by a snow-storm on the 17th, which played havoc with the young lambs. Luckily the snow did not lie long, and although the percentage of lambs has been considerably reduced, the crops and pastures in this usually dry district look remarkably well. A fierce gale was experienced here on the 25th from the south-west, when trees were uprooted, fences and buildings blown down, &c.—*G. Reid.*

OAMARU.—October was a wretched, wet, cold month, with cold winds, snowstorms, and blizzards, and vegetation has been greatly retarded in consequence. Fields are under water, and large areas in most of the wheat crops are inundated and perished. Rainfall, 4.70 in. The weather now shows signs of clearing. Teams have been unable to work the land for the past three weeks, therefore the preparation of the land for root crops is delayed and the work is very backward.—*W. F. Flower.*

PALMERSTON SOUTH.—The first half of the month was fine, with unusually high temperature for the time of year, while equinoctial gales were in evidence during this period. The latter part was very boisterous and cold—heavy rains and bitterly cold winds, hail-showers, and three falls of snow on higher levels in one week. Total rainfall, 5.28 in. Rain fell on seventeen days, the maximum fall being 1.49 points on the

17th, but there have been three falls of over an inch. All farm-work has been seriously delayed, and is now backward. There has been heavy mortality among lambs on high country, as the lambing just commenced when the rough weather set in. Given warm weather now, there will be an excellent growth all round.—*C. S. Dalgliesh.*

DUNEDIN.—The weather during the whole of October was extremely wet, dry or warm days being few and far between. This has had a bad effect on everything except pastures, which are very good, and there is an abundance of grass. The ground which is ploughed and worked for potatoes, mangels, and early varieties of turnips is saturated with water, and there is no prospect of being able to sow the above-named crops for some time. This is unfortunate for farmers, as the season is well advanced.—*J. R. Renton.*

MOSGIEL.—During the month of October the weather was anything but favourable for the district. It rained on fourteen days, very heavy rain setting in on the 14th which lasted until the 17th, causing rivers to overflow their banks, which flooded a large area of land. The flood has done a good deal of damage to any crops sown. No loss of stock has been reported so far. The weather has ultimately cleared, with warm sunshine.—*H. McLeod.*

STRATH TAIERI.—Very windy weather was experienced up till the middle of the month, and from then on till the 28th it was very wet and stormy, with several falls of snow on the higher levels, which has reduced the lambing percentage on hill runs very considerably. Grass is plentiful, and cereal crops are growing well. Where the state of the land permits, farmers are busy preparing for turnip-sowing.—*W. Scott.*

MANIOTOTO.—A very wet month. During the last fortnight there were several falls of snow; at present the high country is covered. All the creeks have been running full and the Taieri River is in high flood. The ground has been too wet to work, and will have the effect of making a late harvest. Lambing is well on, and so far the death-rate through rough weather has been low. There is every appearance of a good percentage of lambs. Stock are in good condition.—*A. T. N. Simpson.*

CLYDE.—The weather for October was very exceptional for this district, it having been treated with more rain than it has been for many years, which has given everything on the farm a really good start. There is abundance of grass all through the district, and all crops are coming away very well. By the good start things have got it seems to be a very promising year for the farmer. Lambing in most parts of the district is almost finished, and there seems to be a good percentage, and not a great number of deaths. There were a good few floods all throughout the district during the month, but very little damage seems to have been done.—*Thomas N. Baxter.*

BALCLUTHA.—The weather for the month of October was most unseasonable, 255 points of rain having fallen. It rained on ten days, and the heaviest fall being on the 15th, when 78 points was registered. Barnego and Inch-Clutha Settlements suffered considerably from floods, though there was not much loss of stock, which were mostly removed to high country. The pastures on these settlements are considerably covered with silt, and potatoes which were sown will in many cases be ruined. Farmers are now preparing for the general turnip crop. Pastures generally are beginning to look very well. There is every indication of a record lambing in the district. The weather is now mild.—*Hugh A. Munro.*

OWAKA.—October was a changeable month, with rain showers. The rainfall, though not extremely heavy, was frequent, and prevented the farmers getting their crops in. Several frosts were experienced, and most of the early potatoes were cut down on the 23rd. Grass is very plentiful along the coast, but further inland growth has been checked by cold showers and frost.—*R. McGilivray.*

TAPANUI.—The weather during the month was again very unsettled, brief intervals of fine weather alternating with extremely boisterous, wintry spells, with too much moisture and lack of sunshine and heat. A heavy frost was experienced on the 23rd, which no doubt did damage. Oats are still being sown, but much of the land intended for cereals will go into green crops. Pastures are looking very fine and feed is abundant. Roxburgh and Miller's Flat districts are looking extremely well, there being a splendid growth of winged thistles on the lower faces. In the latter district the native *danthonia* (*Danthonia racemosa*) is flourishing and rapidly spreading on the warm faces. Tapanui rainfall, 4.93 in.—*W. J. McCulloch.*

LAWRENCE.—This month was very broken, there being several successive days of heavy rain, with floods in low-lying localities, but it has done a lot of good by drowning a large number of young rabbits. On the 25th and 26th it was bitterly cold, with a slight fall of snow on the higher levels, which must have been detrimental to late

lambling. Earlier lambling escaped fairly well, and the mortality is not high. Given plenty of warm weather, crops will make a rapid growth.—*R. Barron.*

GORE.—With the exception of a few days the past month was cold and wet, and has seriously delayed farming-work, a good deal of the oat crop being still unsown. In a number of cases land that was originally intended for grain crop will now be sown in rape and turnips. During the month we experienced some very high winds and the weather generally was very bad. The grain crops already sown are coming on fairly well in spite of the unseasonable weather.—*B. Grant.*

LUMSDEN.—October was an exceedingly wet and boisterous month. Heavy continuous rains flooded the rivers, doing a lot of damage to farmers. During the month a heavy fall of snow was experienced. Late frosts were particularly unwelcome to those with promising early potatoes. Farmers have had an unusually trying time, the ground being so thoroughly wet, with rain and flood waters, that all farm-work had to be suspended. Consequently there is very little grain sown so far. The rainfall for October should constitute a record.—*W. S. S. Cantrell.*

INVERCARGILL.—October was a boisterous month—both cold and wet, with a severe frost on the night of the 21st, which put back early potatoes. Strong winds were experienced, followed by rains, which caused considerable delay in finishing the sowing of oats. In some instances land that was intended to be sown in oats will now be put in turnips as some farmers consider it too late now to sow grain. Rainfall for the month, 4.97 in., falling on seventeen days.—*J. R. Whyborn.*

OTAUTAU.—The weather throughout the month was bad for farm-work, consequently many are hesitating as to sowing at all, owing to the lateness of the season. On the night of the 21st a heavy frost was experienced, cutting down all early-sown potatoes, and on the 25th a very heavy storm was experienced.—*H. F. Dencker.*

QUEENSTOWN.—The month of October was exceptionally wet, no less than 6.69 points of rain being registered at Queenstown, which is generally acknowledged to constitute a record for this district for a number of years. The country, therefore, received a thorough soaking, which was badly needed after seven to eight years drought. The outlook from a pastoralist and farmer's point of view is very promising, as a little fine weather would make a great rush of growth of all descriptions.—*A. Clarke.*

PEMBROKE.—This month has been very unsettled, being exceptionally wet and cold. So much rain has not fallen for years, and several light coverings of snow have fallen on the higher country. We have also experienced some very strong gales. The season, although promising, is late on account of the lack of warm weather.—*J. A. Griffith.*

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Mr. J. G. Moore, of Buenos Aires, has been appointed honorary New Zealand Agent in the Argentine.

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The dairy herd at Ruakura Farm of Instruction is milking much better this year than last. There has been an average improvement of at least half a gallon a day, and in one case an advance of a full gallon. In this instance the cow, a grade Shorthorn, has been giving about 5½ gallons of 3.8 milk. Another cow, a Jersey (Eureka), has given a week's record of 341 lb. of 4-per-cent. milk, whereas her best week's record last season was 287 lb.

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The first draft of lambs from the Ruakura Farm of Instruction—a hundred, half of which were by Southdown and the other half by Border Leicester rams, all being out of Romney-Lincoln ewes—were sold on 7th October, being then ten weeks old. The lambs weighed up to 40 lb. and realised 15s. a head in the local market. The season has been exceptionally wet, and the success of the lambing operations at the farm was due principally to the good supply of mangels on hand at lambing-time and subsequent thereto.

## THE FRUIT CROP.

THE officers of the Orchards, Gardens, and Apiaries Division report as follows regarding orchard conditions for the month of October:—

**WHANGAREI.**—The weather during October has been changeable, and the cold showers accompanied by southerly winds during the last two weeks have somewhat delayed seasonable work in the orchards. Fortunately the weather has now taken up, and orchardists are busy getting on their first spray for the codlin-moth. All stone fruits with the exception of nectarines, which are thin, have set medium to heavy. Apples medium to heavy. Pears heavy, and in some localities very heavy. There are a few sweet oranges to come off, which are a fair sample. Peach-curl is rather bad.—*J. W. Collard.*

**AUCKLAND.**—Poverty Bay prospects of apples, pears, plums, late peaches, and gooseberries are good. Nectarines and early peaches moderate. Apricots excellent. Lemons considerably damaged by frost of the 5th August.—*W. R. L. Williams.*

**AUCKLAND NORTH.**—Weather boisterous and colder than usual. Prospects good generally. Fair supply of strawberries.—*W. C. Thompson.*

**AUCKLAND SOUTH.**—Weather an improvement on last month. Wet and fine days about equal. Occasional cold, boisterous wind doing a great deal of damage to young foliage. Japanese plums practically a failure. English plums fair to good. Early and medium-early apples have set well, and there is every indication of a heavy crop. Early pears blossomed well, but very poor setting. Potatoes are looking well. Growers have begun to dig, on account of high prices ruling.—*N. R. Pierce.*

**HAMILTON.**—The weather throughout the month has been very changeable. Leaf-curl is rather prevalent in districts where winter spraying was neglected. Arsenate spraying for early varieties of apples has just started; other varieties blooming freely. Indications are for a good average crop.—*T. E. Rodda.*

**WANGANUI.**—Prospects of fruit crop, in spite of recent gale, have improved all round, more especially apples and pears, which have generally set well.—*W. C. Hyde.*

**MANAWATU AND WAIRARAPA.**—The majority of the orchards in the Manawatu and Wairarapa are looking well. Rough weather was experienced towards the end of the month, but practically no damage was done. Peach-curl is prevalent in some parts where no Bordeaux mixture has been used. Growers are busy spraying with arsenate of lead for the codlin-moth. There is every appearance of a good apple and pear crop.—*Geo. Stratford.*

**HASTINGS.**—The frost danger on several occasions during the month caused the fruit-growers considerable anxiety. During the latter portion of the month heavy rains fell, and cold weather prevailed, resulting in heavy falls of snow on the surrounding hills. This again renewed the danger of frosts, but although a few degrees were recorded nothing of a serious nature happened. The apricot crop this season is a record. All other fruits are carrying heavy crops excepting apples, which are considerably lighter than last season. All classes of vegetables are doing very well—in fact the district could scarcely look better.—*J. A. Campbell.*

**WELLINGTON.**—The weather for this month has been very changeable, consisting of heavy gales alternating with a few fine days. Japanese plums give promise of an abundant harvest. Peaches, nectarines, and apricots are poor. Apples and pears give promise of a heavy yield. Cultivation and spraying operations are in most cases very backward, owing to the bad weather experienced during the past six months. All vegetables are in good demand in the markets.—*T. C. Webb.*

**NELSON.**—Fine weather prevailed throughout the month. On the 27th October a severe frost was experienced, doing extensive damage to tomatoes and potatoes, principally in Toitoti Valley and Stoke, but apparently doing no damage to fruit crops. Notwithstanding very wet conditions during September, while stone fruits were blossoming, there are prospects of a very fair crop. Apples and pears are setting heavily. Black-

spot is making its appearance on pears in some localities, and peach-curl is very prevalent. Lime-sulphur solution is being extensively used for spraying this season in lieu of Bordeaux mixture.—*J. H. Thorp.*

CHRISTCHURCH.—The month has been exceptionally free from late frosts, consequently there is every appearance of there being a record crop of fruit this season, almost all varieties setting freely. There is still a fair quantity of local apples on the market.—*W. J. Courtier.*

TIMARU.—Mostly all varieties of fruit has a good show of blossom, and in nearly every instance have set well. The latter portion of the month, however, has been very wet and stormy, strong cold winds and hail prevailing. Reports to hand point to diminished yield owing to the adverse weather. The raspberry bud-weevil has been causing a good deal of damage.—*A. B. Mansfield.*

DUNEDIN.—Apples and pears are setting well; apricots good, peaches fair to light in some places, plums good. Small birds are doing a great deal of damage by picking out the young fruit and buds. Peach leaf-curl and shot-hole fungus are very prevalent, owing to the wet season. Strawberries are looking very well and showing great promise.—*W. T. Goodwin.*

## THE LATE STORM.

Officers of the Orchards, Gardens, and Apiaries Division report as follows regarding the damage done to orchards by the recent storm:—

WHANGAREI.—Damage done orchards by recent bad weather only slight, and confined chiefly to American plums.—*J. W. Collard.*

AUCKLAND NORTH.—Very slight damage to young fruit. Orchards generally well sheltered.—*W. C. Thompson.*

AUCKLAND SOUTH.—No serious damage done to fruit trees recent storm.—*N. R. Pierce.*

AUCKLAND.—No material damage done to orchards by recent bad weather.—*W. R. L. Williams.*

HAMILTON.—Peaches, nectarines, and plums in some places rather badly affected by cold winds and slight frosts. Damage to district as a whole nothing very serious.—*T. E. Rodda.*

HASTINGS.—Practically no damage done to fruit crop by rough weather.—*J. A. Campbell.*

WANGANUI.—Damage done to orchards here by recent gale only slight, and confined to young unprotected fruit.—*W. C. Hyde.*

PALMERSTON NORTH.—Recent bad weather had no effect on fruit crops in this district.—*George Stratford.*

WELLINGTON.—During the latter end of this month an extremely heavy gale was experienced throughout my district, causing a good deal of damage to fruit-trees that were in an exposed position. In most cases trees that were showing a mass of bloom are now left without any sign of blossom. Trees that were provided with shelter have not suffered much. Pear-trees seem to have suffered the most.—*T. C. Webb.*

NELSON.—Damage chiefly confined to the Toi Toi Valley district, where the tomato and early potato crops suffered considerably.—*J. H. Thorp.*

CANTERBURY.—Practically no damage to orchards by late bad weather.—*W. J. Courtier.*

CHRISTCHURCH SUBURBS.—Exposed trees received severe check, but gardens generally well sheltered, and do not think damage as severe as at first anticipated. Have not heard of any damage to tomato-houses.—*F. A. Reid.*

TIMARU.—Reports from Peel Forest, Temuka, Geraldine, Ashburton, Totara Valley show extensive damage by wind and hail to blossoms and newly set fruit. Damage principally caused by the severity of the wind.—*A. B. Mansfield.*

DUNEDIN.—Recent bad weather has not affected crops to any noticeable extent.—*W. T. Goodwin.*



## WEATHER DURING OCTOBER.

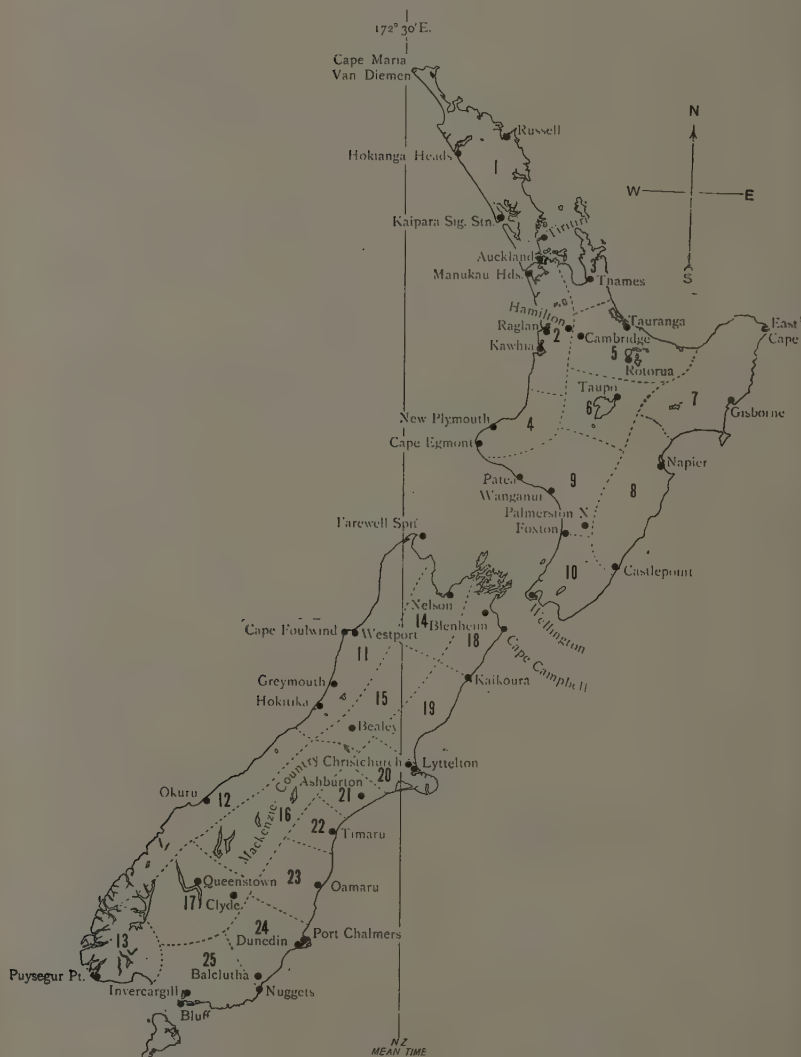
## DISTRICT NOTES.

D. C. BATES.

*Chiefly from Telegraphic Reports.*

District.

- 1, 2. Strong westerly winds predominated, with cool and cloudy weather. No particularly heavy rain fell during the month, precipitation being usually of a showery nature, and mostly confined to the night-time. Between 40 and 50 per cent. less rain than the average for October. Westerly gale and hailstorm on the 26th.
- 3, 5, 6. Generally below the average rain reported in these districts, particularly near the coast. Scattered stations further inland, however, had about the average, and a few recorded a slight excess. The wettest period was between the 16th and 26th; the rest of the month, except on the 7th, when heavy rain fell, was moderately fair. On the 26th a severe southerly squall accompanied with hail-showers was experienced.
4. Changeable weather prevailed, with frequent showers, but no heavy rain was recorded, and the total was less than the average by from 40 to 50 per cent.
- 7, 8. Precipitation was considerably in excess of the average, in many places over double, the greatest proportion falling on the 20th and 23rd. On the latter day some stations recorded as much as 3 in., some portions of the low-lying country becoming moderately flooded. On the 26th snow fell on the hilly country. Some fair weather was experienced from the 1st to the 12th, and again towards the close of the month.
- 9, 10. The weather during the month was generally unsettled, but the rainfall was not excessive, being slightly less than the average in most parts. Between the 16th and the 26th not a day passed without some rain falling, and on the afternoon of the 26th a most severe south-westerly gale was experienced. Some of the high inland stations reported snowstorms about this time.
11. In the northern portion of the district the total rainfall was under the average by 50 per cent., the percentage below decreasing further south, and in the southernmost portion about the usual amount being recorded. Heavy rain fell on the 15th and 16th, when many of the rivers flooded. The first half of the month was dull and wet, but during the latter half mild and warm weather predominated.
- 12, 13. Weather similar to district 11, but rainfall usually above the average by about 25 per cent.
14. The rainfall was about 55 per cent. below the average. Fair to cloudy weather prevailed, with occasional strong breezes. On the 26th a cold southerly squall accounted for a considerable snowfall on the hilly country, and this was followed by a severe frost.
15. Heavy rain fell on the 14th, 15th, and 16th, but the total for the month was about the average. Cloudy and misty weather was somewhat prevalent, and snow fell on several occasions.
16. The beginning and end of the month was fair, but changeable and showery conditions prevailed from the 7th to the 25th, and on the 16th some snow was recorded. The total precipitation exceeded the average by about 30 per cent.



17. This district experienced a rainfall greatly in excess of the average for October, at many stations treble the usual being recorded. The heaviest falls occurred about the middle of the month, and cold, cloudy, and showery weather predominated. Snow fell frequently on the higher levels.
18. Over all this district less than the average rain fell, the difference varying somewhat. In the northern portion the percentage below ranged from 40 to 65 per cent., while further south a difference of only 15 per cent. was recorded. Strong gales were experienced on the 6th and 26th; on the latter date a heavy south-westerly gale blew, and snow fell on the high country. Although cloudy at times, fair weather predominated. A severe frost occurred in parts on the 26th.
- 19-25. The rainfall was excessive in all these districts, over double the average falling at many stations. The heaviest fall occurred on the 16th generally, on which date also some heavy falls of snow were experienced in the back country. Several electrical disturbances were reported in many of these districts, especially on the 1st, 21st, and 31st, the latter being remarkable for the large-size hailstones which fell. The first half of the month was the most favourable. After the 15th the weather was very unsettled, cold southerly winds chiefly prevailing.

## SUMMARY.

Throughout the month the type of pressure-distribution caused weather of an unsettled character, the longest period of fair weather generally being experienced between the 27th and 30th, when the centre of an anticyclone passed over the northern half of the North Island. Between the 1st and the 16th the barometer was very unsteady and continually below normal in the south, accounting for a prevalence of northerly and westerly winds and changeable weather, particularly in the western districts.

Of the depressions which passed near enough to unfavourably affect the weather-conditions of the Dominion the following were the most notable: (1.) A small but intense westerly "low," which passed over the South Island on the 15th and 16th, and caused heavy rain and floods in Westland and Southland. (2.) In the rear of the above a shallow cyclone made its appearance, the centre of which moved across the northern portion of the South Island on the 19th. Much mist and fog was experienced about this time, and heavy rain fell on the east coast districts as the trough passed to the east. (3.) A depression off East Cape on the 23rd and 24th. Very heavy rain fell in Hawke's Bay, and low-lying country in parts became flooded. (4.) On the 25th and 26th a steep V-shaped depression in its passage caused strong westerly winds veering to heavy south-westerly gales in many parts of the country, accompanied by hail and heavy showers, with snow on the higher levels. This depression was the most striking one during the month, but its effect was of short duration, and the advance of an anticyclone brought a favourable change in weather-conditions.

The total month's rainfall was excessive in all the east coast districts southward of East Cape and in the southern half of the South Island, but elsewhere less than the average amount was recorded.

Several thunderstorms were experienced, particularly in the Canterbury districts on the 1st, 21st, and 31st.

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Something like a record in hay-making for the Waikato has been established at the Ruakura Farm of Instruction. Lucerne was mown on 28th October, and was safely stacked by the 9th of the present month, notwithstanding very bad weather. With the aid of sweeps, the Manitoba hay-stacker, and a good staff of men, the hay of a nine-acre crop was stacked in 3½ hours, excluding the time occupied in the rakings.

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The Minnesota State Dairymen Association (U.S.A.) is offering £10 in cash prizes to the boys and girls under eighteen years of age who will keep the best records of dairy herds at home. Records must show the amount of milk and butter-fat, the value of the butter-fat, the cost of feed, and the net returns from each cow. Each contestant must keep records of at least six cows for six months.

## ANSWERS TO CORRESPONDENTS.

## MAIZE, MANGELS, AND POTATOES.

MR. G. P. CATLEY, Te Horo, writes,—

Would you please inform me through the *Journal*—

1. What is the best kind of maize to plant at this time of the year, and also for a later crop for fodder purposes?
2. What is the best manure to apply, and the quantity?
3. What is the best fertilizer for mangels, and
4. For potatoes?

The Fields and Experimental Farms Division replies,—

1. The following varieties of maize are suitable for spring planting: Ninety Day, Golden Beauty, Red Horse-tooth, Yellow Moruya, Early Red Hogan, Clarence Wonder. Among the late varieties the following should all be found useful: Brunning's Somerton White, Hickory King, Eclipse, Boone County, Virginian Horse-tooth, Brazilian Four Corn.

The Agricultural Chemist replies,—

2. For maize, apply 1 cwt. superphosphate and 1 cwt. bonedust per acre.
3. For mangels, use  $1\frac{1}{2}$  cwt. superphosphate, 2 cwt. guano, and  $\frac{1}{2}$  cwt. sulphate of potash, per acre.
4. For potatoes,  $4\frac{1}{2}$  cwt. superphosphate,  $\frac{3}{4}$  cwt. sulphate of ammonia, and 1 cwt. sulphate of potash, per acre.

## MISCELLANEOUS QUERIES.

MR. W. T. PROWSE, Stanway Road, Halcombe, writes as follows:—

1. What would you consider the best crop to put in for cows in case the mangel crop was a failure, and how late would it be advisable to sow mangel-seed for a crop?
2. Could you give me any information as to roguing peas? I have about 7 acres of Stratagems, and would like to rogue same.
3. Would you please give me some information how to cure, or treat, young calves that get blown, or what steps to take if taken in time?
4. I had a cow calved, and her breeding-bag came out after calving. I never saw such a case before, and would like to know if there was any chance of saving life in such a case.

The Fields and Experimental Farms Division replies,—

1. The best crop to put in for cows in case the mangels prove a failure is maize, to be afterwards converted into ensilage. Maize may be sown as soon as mangels are recognized as having failed. Mangels may be sown in the North Island not later than the beginning of November. Swedes may be sown much later.
2. Roguing peas: So soon as the plants come into flower, hand pull those dissimilar to the main crop.

The Live-stock and Meat Division replies,—

3. Your query is rather vague. It would seem from the latter part, "or what steps to take if taken in time," that you are losing some. Young calves fed from the bucket and allowed to swallow too quickly are often distended after the meal. This, however, soon subsides. If your trouble is more serious write again, giving full particulars as to age, feeding, &c.
4. This accident is generally due to after-pains and failure of the mouth of the womb to contract properly. If the womb has only been everted a short time, and is carefully returned, there is no reason why the cow should not do well. If,

on the contrary, the womb has been out some time, and has got cold and swollen. It is very difficult to return, and the animal generally dies. In returning the womb the animal should be made to stand, and the organ supported in a clean sheet by a man on each side. The operator should wash his hands carefully and see that his nails are short. If the afterbirth is adhering, it should be carefully removed, by a rotary movement of the fingers and thumb at each "rose." Any dirt, bits of straw, &c., should be carefully removed, and the whole cleansed by gently washing with blood-warm water or milk. The closed fist should then be applied to the fundus of the organ, and gently pressed upward and forward. At the same time endeavour to return the "neck" with the other fist. The assistants should also assist him by holding the sheet as high as possible, also applying pressure in a forward direction. If care and patience are exercised the womb can generally be returned without injury. When this is done the arm should be kept in for ten minutes or so to allow the circulation to become thoroughly established, and the parts to readapt themselves. If this is not done she may force the organ out again. If the animal continues to strain, 2 oz. of laudanum may be given in a pint of cold water, and a rope truss may be put on. The standing should be banked up behind, so that the hind quarters are raised quite a foot higher than the fore ones. The operation may appear a little difficult to the ordinary farmer, but in case professional assistance cannot be obtained it should always be attempted.

#### BACTERIA-INOCULATED SOIL, BLUE-GUM, AND PINUS INSIGNIS.

J. D. W., Greendale, writes,—

Could you please answer me through the correspondence columns of your *Journal* the following questions:—

1. Does the Government supply the bacteria for inoculating the soil for the growing of lucerne and other leguminous crops, such as peas, beans, &c.?
2. Could young blue-gum plants from 4 to 6 in. high, such as can be found growing in large numbers in plantations of these trees, be safely transplanted, and, if so, when would be the right time to do so?
3. Would it affect the germinating-qualities of *Pinus insignis* seeds if the cones were opened before a slow fire in order that the seeds may be shaken out?

The Fields and Experimental Farms Division replies,—

1. Particulars of the Department's offer of lucerne-seed, lime, and inoculated soil to experimenters was published in last month's *Journal*. The Department does not supply bacteria-inoculated soil for other leguminous plants.

The Orchards, Gardens, and Apiaries Division replies,—

2. These plants may be transplanted, but they should be "wrenched" some time previously. When wanted they should be lifted with a ball of earth, and replanted as soon as possible.
3. No harm so long as not allowed to get too hot. Why not tie the cones in a piece of loose scrim and hang them up either under the tree or in a warm room?

#### GRASS-MIXTURE.—LIQUID MANURE.

"GREENWOOD," Maungatua, writes,—

1. Can you, through the columns of the departmental *Journal*, advise me of a suitable mixture of grass and clover seed to sow, and how much per acre? It is for grazing dairy cows that I want it. I would like a good share of cow-grass included. The ground is a heavy clay soil on a hard clay subsoil. It has a good natural drainage, being a broad ridge, and is situated at the foot of the hills.
2. Could you advise me through your *Journal* if the drainage from the byre stables and pigsties should be diluted before applying it to grass paddocks? I have been told that it is too strong in its natural state.

The Fields and Experimental Farms Division replies,—

1. The Fields Supervisor in Otago being on leave of absence, the following information was obtained from persons knowing the district well: "We would suggest the following as a suitable mixture of grass and clover seeds to sow on the



heavy clay ground in the Maungatua district: Ryegrass, 24 lb.; cocksfoot, 12 lb.; white clover, 2 lb.; alsike clover, 2 lb.; cowgrass, 2 lb.: or a total of 42 lb. to the acre. If the farmer making inquiry was not particular as to cost we would add some more expensive grasses, but as, generally speaking, the land in the Maungatua district is broken up every four years or thereabouts, we hardly think it likely that the farmer will go to the expense of the dearer grasses, and consider he would have a suitable pasture from the above-named seeds."

2. The drainage from byre stables and pigsties should be diluted to three-fourths water and one-fourth drainage. It is too strong in its natural state.

#### PRESERVING BUTTER.

MR. E. H. LAMBERT, "Aylesbury," Shannon, writes,—

Would you kindly inform me through the *Journal* how to preserve butter for the winter. In the summer I usually have more than I can dispose of, while in the winter I am obliged to buy butter.

The Dairy-produce Division replies,—

The best and surest way of preserving butter for winter use is to place it in a freezing-chamber at a temperature of from 10° to 15° Fahr. Where it is not desired to follow that course, the next-best plan is to pasteurize the cream, salt the butter a little heavier than usual, and add also about  $\frac{1}{2}$  per cent. of butter-preserved; then store the packages containing the butter in a cool, dry place.

#### SEED POTATOES.

MR. E. V. FREED, Clyde, Otago, writes,—

In one of your recent numbers the Manager at Ruakura refers to the Up-to-Date potato. Would there be any chance of getting some true stock from there, as I find some difficulty in obtaining the type locally?

The Fields and Experimental Farms Division replies,—

There is no surplus of Up-to-Date seed potatoes to be disposed of from Ruakura. The experiences of potato-growers in other countries are that it is undesirable to use potatoes brought from a warm climate to a colder one for seed. The reverse is attended with the greater advantage.

#### HELIANTI.

MR. A. PROUDLOCK, Raglan, writes,—

I beg to draw your attention to the enclosed clipping taken from the *Raglan Chronicle* of the 29th August last, and would be pleased if you would tell the readers of your *Journal* whether these qualities given herein have been proved by your Department, and, if so, where the tubers are to be obtained.

The Fields and Experimental Farms Division replies,—

You are referred to the contribution on this plant appearing on page 25 of the *Journal* of July, 1911. Helianti has been used for two seasons past at the experimental farms. The results, so far as tubers are concerned, have been somewhat disappointing. Tests are being made this year on the use of the stalk as a food material for stock. Results so far do not commend this plant for extensive use by farmers.

#### PEACH-CURL.—BEES.

W.L.R., Waikato, writes,—

Will you kindly answer the following questions for me through the next *Journal*:—

1. What is the trouble with the peach-tree of which I enclose leaves? It had the same thing last year. It is in rather a windy situation, and has been planted three years. What treatment should be given?

2. From what do bees mostly get honey in August, September, and October?

The Orchards, Gardens, and Apiaries Division replies as follows :—

1. The tree is attacked by peach-curl. Full directions for the control of this disease is given in the *Journal* for June last.

2. It depends a good deal on the season and the particular locality in which the apiary is situated. Bees rarely get much honey in August or the beginning of September, while from then on through October white clover would be the principal flowers visited. The flora would probably be mixed, hence a porportion of the honey would be gathered from the various flowering plants and shrubs that are most in evidence throughout the district.

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#### YELLOW SCOUR IN TURKEYS.

MESSRS. GLUYAS BROS., Balfour, Southland, write,—

If you know of a cure for yellow scour in turkeys would you be kind enough to put it in the *Journal*.

The Live-stock and Meat Division replies,—

There are so many reasons for this trouble that it is impossible to say without examination of an affected bird to what cause it is due. There is no cure—it is all a matter of prevention. Please write to this Division again giving all the information you can as to symptoms and the whole history of the trouble as far as your observations go. Yellow scour is often a sign of tuberculosis.

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#### POULTRY TROUBLE.

MR. T. G. RISELEY, Otira, Westland, writes,—

Could you tell me through your columns the cause of a white spot appearing on a hen's comb at the back of her head, and also the cause of the feathers coming off the back of the head? Is it overfeeding? They are well looked after, having plenty of range, good food, dry houses, and nests.

The Live-stock and Meat Division replies,—

The white spot on the comb is probably the result of a slight abrasion which has admitted a microbe. Dissolve a Chinisol tablet in half a breakfast-cup-ful of water, and sponge the affected part. Feathers often come off at the back of the head when the bird has passed through a heavy laying season. It is sometimes due to a depluming mite. Apply lightly a mixture of equal parts of sulphur and lard. Feeding has nothing to do with the trouble.

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#### ERADICATION OF WEEDS.

MR. T. HORTON, Christchurch, writes,—

Would you kindly let me know through your *Journal* the best way to kill weeds on a garden-path?

The Orchards, Gardens, and Apiaries Division replies,—

Arsenate of soda is a specific which has been found satisfactory in preventing the growth of plant-life on paths. The following is the formula for making the mixture: Boil 1 lb. of white arsenate in 3 gallons of water; dissolve 2 lb. of washing-soda in 7 gallons of water; mix the two together and apply.

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#### SALTING HAYSTACK.

"SUBSCRIBER," Meadowlands, writes,—

Will you kindly, through the *Journal of Agriculture*, inform me the right quantity of salt to put in stack per ton of rye-grass and clover hay?

The Fields and Experimental Farms Division replies,—

The quantity of salt that may be used with the greatest advantage has not been determined. This rests with the discretion of the owner. It will be realized

that no arbitrary quantity can be set down, for hay that is being stacked in good order cannot well be improved by any addition of salt, whereas hay that has been exposed to the weather and that is in poor condition is specially improved by the salt. The quantity cannot be definitely given. It is usually described as "a good sprinkling." From 10 lb. to 20 lb. per ton is possibly about the best quantity to use.

#### PINUS INSIGNIS.—LAMBS.

MR. L. AIREY, Taikorea, writes as follows:—

1. I notice there is a soft white blight on a great many of the *Pinus insignis* trees on the place this year, more especially on the younger ones—two- to four-year-olds. Will you kindly inform me what it is, and how best to deal with it; also, does it spread to the trees near by?

2. Still-born lambs: A great many lambs were either born dead, or died just after birth. I had 700 ewes (400 two-tooths) on 20 acres of turnips for nine weeks before lambing—crop only average; and the sheep had also the run of a big rough paddock, and were not fat when lambing. Nature of land is light sandy scrub country. Can you tell me why the lambs were born dead?

The Orchards, Gardens, and Apiaries Division replies as follows:—

1. Judging from your description, the insect attacking your young pine-trees is known as "chermes." It sometimes renders trees sickly for a time, but they generally outgrow attacks, though some languish. There is no mechanical means of controlling the pest which can be profitably applied to a pine plantation of any considerable size.

The Director of Live-stock and Meat replies,—

2. I am afraid I cannot help you much in the matter. It would have been more satisfactory had a *post-mortem* examination been made of some of the lambs. It is evident something happened to the ewes during the latter period of pregnancy which interfered with the vitality of the lambs. The ewes seem to have had liberal diet. Was the mortality greater among the lambs of the 400 two-tooths than those of the older sheep?

#### FERTILIZERS.

A.S., Piopio, writes,—

Can you tell me through the *Journal* how much lime to mix with superphosphate to make it basic superphosphate, as we can purchase ground lime at Te Kuiti for 18s. per ton? It would be much cheaper for farmers to mix their own than pay £4 5s. to manure-merchants. Is basic superphosphate good for swedes or as a top-dressing?

The Agricultural Chemist replies,—

Fifteen per cent. of slaked lime will revert all the soluble phosphoric acid in superphosphate to the insoluble state—i.e., the form present in basic superphosphate. Basic superphosphate is a good fertilizer for swedes, and is also useful as a top-dressing on some soils.

#### DEHORNING.—BUTTER.

"NEW CHUM," Warkworth, writes,—

In your September issue reference is made in an article on dehorning to the use of caustic for that purpose on very young calves. Could you inform me the best way to treat a calf two months old, also how to go about using the caustic on a calf a few days old?

Also, could you tell me why it is that our butter is so very hard about this date. It is unusually hard, so much so that it will not "spread" at all. The butter is made from the separated cream of two Jerseys. We follow as closely as possible what your *Journal* recommends, washing the butter in the churn, &c. I may mention that our

butter is always harder than that of most other people. The cows are now getting a lot of trefoil, with green oats at milking-time.

The Live-stock and Meat Division replies,—

The caustic used for preventing horns growing in calves is caustic potash, which can be obtained from a chemist in the form of white sticks about the thickness of a lead-pencil. It is very deliquescent, and should be kept in a well-corked bottle away from moisture. It is no use applying it to a calf two months old. Calves should be treated when from one to three days old—preferably one day old. Slightly moisten the skin over the horn-cores, and after wrapping a piece of paper round the caustic, rub the moistened surface over the area, which will be a little larger than a shilling. In a day or so the skin becomes brown, with a little depression in the middle. It may be necessary to apply the caustic again. Care should be taken to see that the caustic does not “run,” or there may be a big scar left. Personally, I do not like the method, preferring to remove the horns when the animals are two to three years old.

The Dairy-produce Division replies,—

The reason why the butter becomes so hard is to be found to some extent in the feed supplied to the cows. The experience is seldom known when the milk from a medium-sized herd is mixed together. It is well known that individual cows at times give an increased quantity of the harder fats, and this is usually more noticeable when the lactation period has advanced considerably. The difficulty can be minimized by heating the cream to 160° Fahr., and then cooling it down to from 60° to 65° Fahr. before ripening. In such cases the churning-temperature should be higher than usual, and care taken to have the temperature of the churn when the cream is placed in it at the same degree of heat as the cream itself. This can be done by rinsing out the churn with water at the same temperature as the cream.

MR. R. THOMPSON, Hawera.—You will find the information you require in portion of the reply to the preceding correspondent.—ED.

#### FRUIT-CULTURE AT TAURANGA.—ESPALIER SYSTEM.

MR. ALEX. FORBES, Miramar, writes,—

I have not seen any mention of the Tauranga Experimental Farm in the *Journal* for a long time, and would like to know whether the fruit-trees there have been a success. I was interested in the espalier system of training the trees which was adopted there, but have not seen any further mention of it for some years. I should think that some particulars about the Tauranga Farm would be of interest to your readers.

The Orchards, Gardens, and Apiaries Division replies as follows:—

Espalier fruit-culture is not advocated for commercial culture in this country—only for small gardens. If you are interested and will call at this office when in town it will afford the officers pleasure to discuss espalier culture and show you illustrations. The fruit-trees are succeeding splendidly at Tauranga Experimental Station.

#### TURNIPS, FIORIN, CARROTS, ETC.

“WAY-BACK,” Kai Iwi, Wanganui, writes,—

Having a sheep-farm in a new bush (hilly) district, and having tried different kinds of turnips on new burns with indifferent success, I would be glad if you would recommend me, through your *Journal*, the best kind of swede turnip to sow with the grass-seed. Are the New Empire or Magnum Bonum suitable varieties where they have to be sown without fertilizers other than the wood ashes?

Is fiorin a suitable fodder plant to include in a mixture for a new burn where we have to depend on cocksfoot for our main supply of fodder, and where the surface soil is

light to a light clay on top of a solid papa-and-sandstone subsoil? Clover, trefoil, and cow-grass seem to have done well so far.

I have tried, with poor result, to grow mangels on new ground as winter fodder for milking-cows, and find it out of the question to pack in fertilizers to aid growth of same. Carrots and parsnips, however, do well, the cows apparently relishing both roots. Could you inform me of the value of parsnips as a fodder for milking-cows—whether they are detrimental to the animals and whether they have any detrimental effect on milk?

The Fields and Experimental Farms Division replies,—

On bush burns where the turnip is surface-sown with the grass, conditions of soil and climate are of far greater importance than variety of seed. It is accepted that the soft turnip is more likely to succeed than the hard varieties; it is conceded that the swede demands cultivation. The turnips usually availed of are Aberdeen Green-top, Purple-top, and Imperial Green Globe.

Fiorin is a grass of comparatively inferior quality; it thrives in damp soils, and it should not be sown when, as you indicate, cocksfoot and clovers can be established.

Carrots and parsnips are excellent foods for stock. Neither affect the quality of milk. These crops are considered more expensive to raise and feed than mangels.

#### FOXGLOVE.

MR. W. L. DAWES, Te Hirua, writes,—

Would you kindly inform me whether the foxglove-plant will die if it is cut above ground and prevented from seeding, as I have noticed that a plant which has seeded has died the following season, the seedlings alone surviving. Wherever the earth is loose the plant readily pulls out, but on firm ground the root breaks off at the surface, so that it would be a larger order to dig each plant out. Any information you can give me as to the quickest method of eradicating it will be gladly received. I noticed your reply to a query on above in the July issue of the *Journal*, but spraying would hardly apply in the present case.

The Fields and Experimental Farms Division replies,—

Some varieties of foxglove are perennial, others biennial. The latter is the species usually found in New Zealand, hence the death of the plant in the season after seeding. The Department has no definite experience to guide you in the best means of eradicating this plant, which in parts of New Zealand is a somewhat serious menace. The only recommendation that can be made is that the plant should be cut. This would probably be successful after it had been repeated in the second season.

#### COW TROUBLE.

MR. JOHNSON CLARK, Te Aroha, writes,—

I should be pleased if you could tell me through the medium of the *Journal* what is wrong with a cow, and the remedy for it. When the cow calved a few days ago I could not milk one quarter. There seemed to be a growth like a knot in the milk-duct just at the top of the teat near the udder. This knot prevented the milk from flowing into the teat, so could not be milked with the hand. I have taken the milk from her in a tube each day, the milk being perfectly good, as far as I can see—it has not been used except for calves. The tube had to be forced through the knot. I have bathed the affected part with hot water each day, and rubbed embrocation and vaseline on, but this does not seem to remove it. I do not think the trouble is mammitis, because the milk is not affected, nor is the quarter inflamed or sore. If you can assist me I shall be obliged.

The Director of Live-stock and Meat Division replies,—

I am afraid I could not give you any definite information about the cow without knowing whether the "lump" in the teat is not a symptom of the contagious form of mammitis. Probably your best plan is to get a clean 2 oz. bottle and cork,



and boil for ten minutes. Wash your hands and the udder thoroughly and dry. When the water containing the bottle has become about blood warm, take the bottle out, and, after emptying, milk direct into it until it is about three-parts full. Cork, label, and pack securely, putting in a short account of the trouble, and post with as little delay as possible to the Officer in Charge, Veterinary Laboratory, Wallaceville. The milk will then be examined microscopically, and advice as to treatment forwarded you.

#### DOUCHE FOR COWS.

MESSRS. WILSON BROS., Glen Oroua, write,—

Would you kindly let us know through your valuable *Journal* whether biniodide of mercury is better to douche the cow's vaginal passage than bichloride of mercury. We are given to understand that the former does not irritate the cow the same as the latter, also that it can be used with a metal syringe, whereas the bichloride of mercury must not come in contact with metal.

Also, kindly advise us of the best way to send samples of milk to the Government Laboratory to be tested for mammitis.

The Live-stock and Meat Division replies,—

The biniodide of mercury does not cause the same amount of irritation as the chloride, but it certainly irritates, and, further, acts upon metal the same as the chloride. I presume you wish to douche the cows a day or so after calving? Why not use solution of Lysol, 1 to 80, or Jeyes' fluid, 1 to 60? These will answer the purpose.

With regard to taking a sample of milk for microscopical examination, get a clean 2 oz. bottle and cork, and boil both for ten minutes. Wash the cow's udder carefully, also your hands, and dry. When the water in which the bottle has been boiled has cooled to bloodheat take it out, empty it, and milk direct from the affected quarter into it. Cork securely, label, and with a short communication saying who it is from, brief account of symptoms, &c., pack securely, and forward with as little delay as possible to the Officer in charge, Veterinary Laboratory, Wallaceville, Wellington.

#### SORREL, LIME, SLUGS, ETC.

MR. JOHN MURRAY, Leigh, Auckland, writes,—

I have a small paddock, stiff clay soil, smothered with sorrel, which I intend to dress with lime at the rate of 1 ton to the acre, and I shall esteem it a favour if you will inform me in your correspondence columns if burnt ground lime would be the best to use. My kitchen-garden and orchard (similar soil to the paddock) is just alive with all manner of pests—snails, slugs, &c. Would burnt ground lime be the best dressing to apply for their extermination?

The Fields and Experimental Farms Division replies,—

Burnt lime is recommended for such soils. You will discover that constant cultivation is necessary to control sorrel; it is even more effective than the application of lime.

The Orchards, Gardens, and Apiaries Division replies as follows:—

Your kitchen-garden would benefit very largely by the dressing of burnt lime which you propose to apply. Several light dressings will be more efficient in controlling snails and slugs than one heavy one.

#### LEMON-TREES.

MR. H. M. SCOTT, Greenmeadows, Napier, writes,—

Would you please tell me in your "Answers to Correspondents" (if you can from my description) what is wrong with my lemon-trees. They are looking sick. The leaves are falling off—some on old wood, and all the young shoots. Small lemons are

turning brown, some are maturing when about the size of walnuts or smaller, and the trees generally are looking dried up. Perhaps the leaflet "Verrucosis of Lemon" will help me.

The Orchards, Gardens, and Apiaries Division replies as follows:—

As Instructor S. F. Anderson was in your vicinity, I asked him to call and see the trees and advise accordingly. He reports that the tips of the shoots are dying, a pretty sure sign indication that the roots are in a damp, cold subsoil. The locality is not considered suitable for citrus fruits.

#### PASPALUM DILATATUM.

MR. J. C. AYTON, Otonga, writes under date the 6th October as follows:—

Would you furnish me with any information you can on the following: Would it be advisable to sow *Paspalum* with turnips (swede), so as to have a good sole of grass after the turnips are fed off?

The Fields and Experimental Farms Division replies,—

There is no recorded experience as to the result of sowing *Paspalum dilatatum*. There is, however, no reason why the seed should not germinate. It is generally accepted that the turnip or swede is a crop of such value that it should be maintained free from weeds and other plants. If anything of this sort is attempted it should be that the *Paspalum* should be relied upon for the final crop, and that sown with it there may be a small quantity of rape. It is also to be considered whether, in the present state of information regarding this plant, *Paspalum dilatatum* should be accepted as a reasonable grass to use. It is essentially a grass of a hot country, and in New Zealand, owing to climatic conditions, there is so long a period during which this grass is absolutely dormant that experience would lead to the conclusion that other grasses are to be preferred. The experience of some years indicate that *Paspalum dilatatum* should be excluded from our farm practice.

#### BORER IN GOOSEBERRY-BUSHES.

MR. JAMES BANKS, Waverley, writes,—

I have the borer in the gooseberry-bushes in my garden, and should be very thankful if you would kindly let me know how to get rid of it.

The Orchards, Gardens, and Apiaries Division replies as follows:—

In the case of the borer in gooseberry-bushes, the best treatment is to cut out and burn the infested branches. This done systematically will soon rid the plantation of the pest. Spraying with whale-oil spray has been recommended by some authorities as deterring the insect from laying its eggs on the bushes.

#### BASIC SLAG AS CONTROLLER OF PLANT-DISEASE.

MR. T. H. BARNETT, Christchurch, writes,—

In the September number of the *Journal* I note, page 217, under the heading "Basic Slag," that its use is valuable to conquer the "curl" of the peach; and I should be much obliged if you would inform me how to employ it.

The Orchards, Gardens, and Apiaries Division replies,—

There is evidently some confusion as to the name of peach-curl. The leaves become curled chiefly through two pests, one the fungus causing the true peach-curl. This is controlled by the application of Bordeaux mixture through the winter, as directed in the spray leaflet issued by this Department—namely, using the winter formula, if possible twice, first just after the leaves have fallen, and again just as the buds begin to swell, taking care to cover the young wood. It is this

fungus disease which causes the chief trouble in New Zealand. The curl referred to by the French orchardists is due to the presence of peach-aphis. This we also have in New Zealand, but it can, save in neglected cases, be controlled by applications of tobacco-wash or kerosene emulsion. The slag used by the French experimenters was apparently in the form of an ordinary dressing to the soil. The matter is, however, still in the experimental stage.

#### TITAN OIL TRACTOR.

MR. ROBERT PRESTON, Manutuke, Gisborne, writes,—

I would be glad if you could inform me whether the Titan oil tractor at Ruakura Farm of Instruction has proved a practical success for general farm-work, such as ploughing, discing, rolling, and preparing land for a crop, and whether it will take the place of eight good draught horses. In other words, should I be well advised to dispose of horses and replace them with an engine? What is the cost of running an engine per day of ten hours, and what horse-power is the engine?

The Fields and Experimental Farms Division replies,—

This tractor has been but recently set up at Ruakura, and so far the season has not afforded any opportunity of trial. In the *Farmers' Union Advocate* of 18th May, 1st June, 27th July, and 31st August of this year the experiences of farmers are set out. The engine at Ruakura is of 20 horse-power. The other inquiry will have to remain unanswered until the implement has been tested.

#### CARNATIONS.

MR. W. PARKES, Huntly, writes as follows:—

Could you inform me as to correct month (or season) of the year to layer carnations? If you would supply me with this information I would esteem it a favour.

The Orchards, Gardens, and Apiaries Division replies as follows:—

The best time of the year for the layering of carnations is during the month of February.

#### WASHING OF EGGS.

MR. S. R. STEDMAN, Cross Creek, writes,—

In last month's *Journal* (page 421) Mr. Cussen writes: "Dirty eggs should be washed." Is this not a mistake? If very dirty, surely they should not be set, and if slightly dirty would it not be best to brush them dry? Washing is liable to fill the pores with dirt, &c., to the detriment of the chick.

The Live-stock and Meat Division replies,—

If the egg is simply brushed a certain amount of the dirt must remain in the pores of the shell and block these up. The washing has the opposite effect. Its drawback is that it tends to make the eggs dry down too much during incubation. This can, however, be checked by applying moisture during the first days of incubation.

#### SCOUR IN CALVES.

MR. HAROLD L. BERNEY, Pipiroa, Hauraki Plains, writes,—

Would you kindly tell me the best treatment for scour in calves. They are about eight months old, and seem to have been badly done by, though they looked all right when I bought them. They have been running in a wet swampy paddock. I have shifted them into good grass and have already lost two, and three more are very bad. They waste away to a shadow, getting very weak. I have given new milk and linseed-oil, but it does not seem to stop scour. From what I can hear a good many calves are affected in the Waikato the same way. Would you kindly let me know as soon as possible.

### The Live-stock and Meat Division replies,—

I should say, from the description you give of the symptoms shown by the calves, that they are suffering from the effects of parasites in the fourth stomach. These parasites are also found in lambs and hoggets, a leaflet on which I am forwarding you. Practically the same preventive and remedial treatment applies in the case of calves. I note that you purchased the calves, and so you cannot say what treatment they were subjected to before you got them. A great mistake rearers make is to rear the calves year after year in the same yard or paddock. This is generally near to the homestead for convenience, and there is no doubt they pick up the eggs of the parasites there or on swampy land. You did quite right to put them on sound pasture. Give them some dry food if they will eat it, such as oaten chaff, hay, &c. I should advise you to try the Lysol treatment. Care must be taken to give it well diluted, as it is irritating to the membrane of the throat. Give each calf one teaspoonful of Lysol (which you can get at any chemist's) in a pint and a half of milk or thin linseed gruel, once a day for three days running, then miss a day or two and give them another three days' course. If they are no better you can give them another course. I am afraid, however, that you will lose more if their strength is not sufficient enough to tide them over the trouble.

### CHOKING COW.

H.W. writes as follows:—

Will you kindly tell me through your *Journal* the best and quickest method of relieving a cow that is choking with a turnip or other obstacle, and badly blown with wind at the same time? I lost a good cow that had a turnip 6 in. long by 2½ in. at thickest end, shaped like a carrot, with small end outwards. I pushed the turnip about 2 ft. 9 in. from nose inwards; but, as cow had a long neck, turnip was still a foot from stomach. I used a broom-handle, and it kept passing the point of turnip, which seemed tight. The cow kept swelling with wind, and at last I punctured her with a knife, but she had fallen down, and it was too late.

### The Live-stock and Meat Division replies,—

Treatment of choking depends a good deal upon the nature of the obstruction and its situation. Usually cattle are choked with roots, such as turnips and mangels, which have been improperly cut up. Many people use the old-fashioned spade, and in consequence, if a man does not know how to use it, unequal angular pieces are the result. If they cannot be properly sliced, pulped, or "fingered," it is better and safer to feed them whole. Potatoes given whole are another cause. If the obstruction is lodged in the pharynx or top of the gullet, it is possible to remove it by passing the hand to the back of the mouth, and remove it in this way. This in many cases is more easily said than done, owing to the object being coated with saliva, and in consequence is difficult to grasp. Once, however, the object is touched the animal usually exerts itself in a forward movement, and the condition is removed by a cough. The *oesophagus*, or, as it is commonly termed, the "gullet," is a tubular organ running down the left side of the neck until it disappears between the two first ribs to proceed to the stomach through the chest, and it is in this organ that too-large portions of food are generally retained, constituting the so-called "choking." The *oesophagus* is composed of a series of muscular fibres disposed in a ring-like manner, and these are what are termed "involuntary"—that is, not under the control of the will. Inside this is the mucous membrane continuous from that of the mouth and attached very loosely to the muscular coat. In consequence of this arrangement cattle can swallow fairly large articles without apparent injury, and when making *post-mortem* examinations such things as old boots, pieces of iron, &c., have been found in the stomach, and the wonder is how they had been swallowed without any apparent injury to the animal. Once the bolus of food passes into the gullet it is independent of the will of the animal to draw it back, and is passed on its way by the contraction of the muscular coat behind it until it reaches the stomach. If, however, it has been improperly salivated, or there is something untoward about it to facilitate its passage, such as being larger or more angular than the organ has been accustomed to, a spasm of the muscular layer occurs, and the object is detained. Owing to the obstruction, the gas from the rumen, which is naturally eructated, cannot pass, and the consequence is that the animal becomes tympanitic or "blown-up." It is always better in a case like

this to employ simple treatment first, as there is no doubt that hundreds of animals are "choked," and the condition is removed naturally, without the owner knowing anything about it. The first thing to do is to relieve the spasmodic condition and to prevent the "blowing-up." Give the animal about half a pint of warm (raw) linseed-oil. Then get a smooth round piece of wood about 2½ in. diameter (such as a domestic rolling-pin), fix a cord at each end, and secure it in the mouth by tying the cords round the head at the back of the horns. This will cause the animal to champ, and roll the jaws from side to side, and this not only facilitates the eructation of gas from the stomach, but also stimulates the muscular coat of the gullet by the swallowing of the saliva produced. If the obstruction can be felt in the neck portion foment with hot water. This should also be done if you cannot feel it, in order to relieve the spasmodic condition. I note you mention in your question about a quick way of relieving the condition. If you have not any complication such as the "blowing-up," have patience, and in the majority of cases, with the above treatment, your cow will soon be all right. If the rumen is much distended with gas it may be punctured on the left side. There is an instrument specially made for this purpose termed a "trochar." This is a kind of knife with a sheath not quite reaching the point. After puncturing, the trochar is withdrawn, and the sheath left in to allow the gases to escape. The objection to puncturing with a plain knife is that portions of the ingesta may come out with the gas and get into the abdominal cavity between the wall of the punctured stomach and the skin, and set up serious trouble. I do not like passing the probang, or so-called choke-rope; and such articles as whip or broom handles should never be used. There are probably more cattle die by the attempt to relieve them by passing these instruments and trying to force the obstruction on towards the stomach than there would be if the animals were left alone. What probably happened in your case was that when your broom-handle passed the piece of turnip it ruptured the mucous coat. This is a fatal accident. Even if a proper probang with a "cup" end is used, great care should be taken, as similar mischief may be done, and it is better to see how patience and simple treatment turns out before resorting to mechanical means.

## STOCK IN QUARANTINE.

The following stock was received into quarantine during the month of October:—

| No.                        | Breed.         | Sex.       | Port of Origin. | Owner or Agent.   | Address.      |
|----------------------------|----------------|------------|-----------------|-------------------|---------------|
| QUAIL ISLAND (LYTTELTON).  |                |            |                 |                   |               |
| 8                          | Holstein ..    | Bulls ..   | Melbourne ..    | J. Coop ..        | Little River. |
| 1                          | Bulldog ..     | Male ..    | London ..       | J. B. Reid ..     | Elderslie.    |
| 1                          | " ..           | Female ..  | " ..            | " ..              | "             |
| SOMES ISLAND (WELLINGTON). |                |            |                 |                   |               |
| 1                          | Pomeranian dog | Male ..    | London ..       | C. S. Hanes ..    | Gisborne.     |
| MOTUIHI ISLAND (AUCKLAND). |                |            |                 |                   |               |
| 1                          | Fox-terrier .. | Male ..    | London ..       | N. A. Nathan ..   | Auckland.     |
| 1                          | " ..           | " ..       | Sydney ..       | Mrs. M. Tucker .. | Wanganui.     |
| 2                          | Jersey ..      | Heifers .. | " ..            | Harold Cotter ..  | Auckland.     |
| 1                          | " ..           | Bull ..    | " ..            | " ..              | "             |



## SHIPMENTS OF PRIMARY PRODUCE FROM NEW ZEALAND TO UNITED KINGDOM.

COMPILED FROM MANIFESTS OF VESSELS SAILED DURING RESPECTIVE MONTHS OF THE CURRENT AND PRECEDING SEASONS.

| Month.             | Mutton,<br>Carcases. | Lamb,<br>Carcases. | Beef,<br>Quarters. | Butter,<br>Boxes. | Cheese,<br>Crates. | Wool,<br>Bales. | Wheat,<br>Sacks. | Oats,<br>Sacks. | Rabbits,<br>Crates. | Hemp,<br>Bales. | Tow,<br>Bales. | Kauri-<br>gum,<br>Cases. | Sundry.               |
|--------------------|----------------------|--------------------|--------------------|-------------------|--------------------|-----------------|------------------|-----------------|---------------------|-----------------|----------------|--------------------------|-----------------------|
| January,<br>1912   | 237,284              | 302,399            | 12,424             | 114,512           | 64,005             | 95,994          | ..               | ..              | 7,295               | 6,865           | 1,942          | 3,407                    | 59 carcasses pork.    |
| 1911               | 175,337              | 287,120            | 13,568             | 90,405            | 46,375             | 127,199         | ..               | 16              | 399                 | 15,234          | 3,302          | 7,094                    | 590                   |
| February,<br>1912  | 208,424              | 273,246            | 18,052             | 101,544           | 62,398             | 106,074         | 607              | ..              | ..                  | 6,831           | 1,615          | 1,056                    | ..                    |
| 1911               | 242,090              | 450,406            | 24,924             | 86,368            | 46,667             | 70,030          | 23,694           | 200             | ..                  | 4,428           | 1,302          | 2,113                    | 1,369 carcasses pork. |
| March,<br>1912     | 324,192              | 518,402            | 20,201             | 64,925            | 49,308             | 70,022          | ..               | 4,980           | ..                  | 3,832           | 1,352          | 2,644                    | 16 carcasses pork.    |
| 1911               | 264,297              | 665,822            | 26,657             | 45,912            | 40,668             | 58,362          | 40,276           | ..              | ..                  | 3,650           | 1,583          | 8,932                    | 2,408                 |
| April,<br>1912     | 213,178              | 355,829            | 7,046              | 38,986            | 38,187             | 31,615          | 4,905            | 2,180           | ..                  | 5,134           | 1,958          | 4,458                    | ..                    |
| 1911               | 178,503              | 491,413            | 19,106             | 14,823            | 33,411             | 42,917          | 38,456           | 6               | ..                  | 9,233           | 1,827          | 2,577                    | 2,431 carcasses pork. |
| May,<br>1912       | 454,506              | 744,287            | 32,691             | 1,441             | 40,535             | 51,833          | 11,157           | 26,569          | 1,500               | 11,963          | 2,826          | 6,287                    | ..                    |
| 1911               | 204,390              | 377,105            | 20,173             | 995               | 20,732             | 33,033          | 93,854           | ..              | ..                  | 7,443           | 1,210          | 7,720                    | 1,087 carcasses pork. |
| June,<br>1912      | 170,738              | 287,697            | 24,605             | 558               | 7,712              | 18,138          | 9,160            | 7,622           | 2,039               | 5,646           | 1,168          | 1,213                    | 221 carcasses pork.   |
| 1911               | 214,079              | 448,432            | 15,789             | ..                | 6,323              | 19,568          | 39,422           | ..              | 14,128              | 4,763           | 525            | 5,528                    | 2,434                 |
| July,<br>1912      | 291,097              | 371,474            | 29,457             | 684               | 1,255              | 16,567          | 44,324           | 23,216          | 20,573              | 7,463           | 1,856          | 5,892                    | 210 carcasses pork.   |
| 1911               | 206,869              | 260,761            | 14,296             | ..                | 276                | 14,100          | 29,452           | ..              | 10,334              | 6,022           | 1,073          | 2,786                    | 175                   |
| August,<br>1912    | 207,239              | 157,589            | 10,478             | 559               | ..                 | 10,409          | 42,580           | 38,802          | 19,562              | 3,758           | 523            | 4,219                    | ..                    |
| 1911               | 66,608               | 110,054            | 3,653              | ..                | ..                 | 5,260           | 31,976           | ..              | 18,231              | 3,443           | 303            | 3,475                    | 203 carcasses pork.   |
| September,<br>1912 | 44,657               | 40,759             | 1,174              | 8,723             | 1,204              | 6,671           | 15,742           | 17,363          | 19,933              | 2,957           | 501            | 3,671                    | ..                    |
| 1911               | 102,031              | 40,057             | 6,059              | 6,404             | ..                 | 7,390           | 38,151           | ..              | 33,059              | 5,604           | 393            | 7,672                    | 220 carcasses pork.   |
| October,<br>1912   | 51,263               | 15,393             | 3,882              | 49,962            | 16,389             | 4,647           | 7,952            | 64,480          | 5,396               | 4,193           | 401            | 9,075                    | ..                    |
| 1911               | 9,417                | 2,043              | 100                | 49,626            | 11,501             | 2,182           | ..               | ..              | 32,094              | 4,514           | 754            | 2,982                    | ..                    |
| November,<br>1911  | 47,770               | 10,427             | 403                | 135,741           | 57,319             | 44,934          | 15,833           | ..              | 16,606              | 7,844           | 2,183          | 3,085                    | ..                    |
| 1910               | 62,926               | 29,877             | 5,554              | 105,759           | 27,749             | 55,551          | 76,594           | 331             | 28,646              | 6,850           | 2,300          | 4,339                    | 911 carcasses pork.   |
| December,<br>1911  | 72,192               | 91,965             | 765                | 103,397           | 46,883             | 54,297          | ..               | ..              | 4,366               | 5,719           | 1,364          | 2,708                    | ..                    |
| 1910               | 82,405               | 157,172            | 13,155             | 182,051           | 67,162             | 59,080          | ..               | ..              | 9,716               | 4,524           | 109            | 5,363                    | 686 carcasses pork.   |

## HEMP AND TOW GRADING RETURNS.

OCTOBER, 1912.

*Hemp*.—The total number of bales graded was 8,871, as compared with 7,349 bales for the corresponding month of last year, an increase of 1,522 bales. For the twelve months ending 31st October, 1912, the number of bales graded was 93,041 as compared with 95,906, for the previous twelve months, the decrease being 2,865 bales.

*Tow*.—During the month 3,083 bales were dealt with, as compared with 1,985 for the corresponding month of last year, an increase of 1,098 bales. For the twelve months ending 31st October, 1912, the number of bales graded was 26,848, as against 28,655 for the previous twelve months, the decrease being 1,807 bales.

## HEMP AND TOW GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF OCTOBER, 1912.

*Hemp.*

| Port.                 | Superior. | Fine.  | Good-fair. | Fair.  | Common. | Rejected. | Condemned. | Total. |
|-----------------------|-----------|--------|------------|--------|---------|-----------|------------|--------|
|                       | Bales.    | Bales. | Bales.     | Bales. | Bales.  | Bales.    | Bales.     | Bales. |
| Auckland ..           | ..        | 48     | 326        | 826    | 176     | 39        | 12         | 1,427  |
| Napier ..             | ..        | ..     | ..         | ..     | ..      | ..        | ..         | ..     |
| Foxton ..             | ..        | 9      | 670        | 2,782  | 60      | 9         | ..         | 3,530  |
| Wellington ..         | ..        | 65     | 1,803      | 1,207  | 170     | 8         | ..         | 3,253  |
| Blenheim ..           | ..        | 35     | 88         | ..     | ..      | ..        | ..         | 123    |
| Picton ..             | ..        | 25     | 35         | 73     | 21      | ..        | ..         | 154    |
| Lyttelton ..          | ..        | ..     | 12         | ..     | ..      | ..        | ..         | 12     |
| Dunedin ..            | ..        | 29     | 25         | 19     | ..      | ..        | ..         | 73     |
| Bluff ..              | ..        | ..     | 133        | 149    | 17      | ..        | ..         | 299    |
| Totals ..             | ..        | 211    | 3,092      | 5,056  | 444     | 56        | 12         | 8,871  |
| Percentages of totals | ..        | 2.33   | 34.85      | 57.0   | 5.0     | 0.63      | 0.14       | 100    |

*Tow.*

| Port.         | First Grade. | Second Grade. | Third Grade. | Condemned. | Total. |
|---------------|--------------|---------------|--------------|------------|--------|
|               | Bales.       | Bales.        | Bales.       | Bales.     | Bales. |
| Auckland ..   | ..           | 237           | 281          | 116        | 634    |
| Napier ..     | ..           | ..            | ..           | ..         | ..     |
| Foxton ..     | 86           | 684           | 16           | ..         | 766    |
| Wellington .. | 278          | 833           | 119          | 10         | 1,240  |
| Blenheim ..   | 9            | 22            | ..           | ..         | 31     |
| Picton ..     | 76           | 65            | 68           | ..         | 209    |
| Lyttelton ..  | ..           | 18            | ..           | ..         | 18     |
| Dunedin ..    | ..           | 14            | ..           | ..         | 14     |
| Bluff ..      | ..           | 77            | 90           | 4          | 171    |
| Totals ..     | 449          | 1,930         | 574          | 130        | 3,083  |

*Stripper-slips*.—Passed for shipment: Auckland, 5; Foxton, 155; Wellington, 166; Lyttelton, 24; Bluff, 16; total, 366. Condemned: Foxton, 16; Wellington, 8; total, 24.

## NEW ZEALAND-VANCOUVER SUBSIDIZED STEAM SERVICES.

FOLLOWING are the shipments of produce for Vancouver and North American ports from New Zealand since June last :—

|                                      | "Zealandia,"<br>10th June. | "Marama,"<br>5th July. | "Makura,"<br>2nd Aug. | "Zealandia,"<br>30th Aug. | "Marama,"<br>27th Sept. | "Makura,"<br>25th Oct. |
|--------------------------------------|----------------------------|------------------------|-----------------------|---------------------------|-------------------------|------------------------|
| Butter, boxes ..                     | 80                         | 1,600                  | 3,987                 | 2,717                     | 4,428                   | 9,777                  |
| Eggs, " ..                           | ..                         | ..                     | ..                    | ..                        | 8                       | 226                    |
| Beef, quarters ..                    | 40                         | ..                     | ..                    | ..                        | ..                      | ..                     |
| Beef, boned, bags ..                 | 605                        | ..                     | ..                    | ..                        | ..                      | ..                     |
| Frozen sundries,<br>packages ..      | 8                          | 4                      | 6                     | 8                         | ..                      | 12                     |
| Wool, bales ..                       | 27                         | 9                      | 21                    | ..                        | ..                      | ..                     |
| Grass-seeds, beans,<br>&c., sacks .. | 260                        | 21                     | 430                   | ..                        | ..                      | 50                     |
| Hides and skins,<br>sacks, &c. ..    | 344                        | 861                    | 425                   | 454                       | 657                     | 721                    |
| Onions, cases ..                     | 2                          | ..                     | ..                    | 3                         | ..                      | ..                     |
| Sheep-skins, bales ..                | 35                         | ..                     | 20                    | ..                        | ..                      | 138                    |
| Jam, cases ..                        | ..                         | ..                     | ..                    | 50                        | ..                      | 125                    |
| Sundries, packages                   | 111                        | 110                    | 144                   | 90                        | 5                       | 21                     |
| Potatoes, crates ..                  | 17                         | ..                     | ..                    | 21                        | ..                      | 23                     |
| K a u r i - g u m,<br>packages ..    | ..                         | ..                     | ..                    | 72                        | 69                      | 46                     |

## NEW ZEALAND-SAN FRANCISCO SUB- SIDIZED STEAM SERVICES.

THE following are the shipments of produce for San Francisco, Rarotonga, Tahiti, and transshipments for Vancouver from New Zealand since June last :—

|                            | "Manuka,"<br>21st June. | "Aorangi,"<br>19th July. | "Tahiti,"<br>16th Aug. | "Moana,"<br>12th Sept. | "Aorangi,"<br>11th Oct. |
|----------------------------|-------------------------|--------------------------|------------------------|------------------------|-------------------------|
| Gum, packages ..           | 24                      | 4                        | ..                     | 14                     | 35                      |
| Seeds, sacks ..            | 340                     | ..                       | ..                     | ..                     | 80                      |
| Grain, &c. ..              | 46                      | 60                       | 82                     | 123                    | 194                     |
| Meats, cases ..            | 153                     | 161                      | 190                    | 326                    | 2                       |
| Onions, cases and sacks .. | 2                       | 5                        | 2                      | 3                      | 3                       |
| Potatoes, " ..             | 37                      | 30                       | 25                     | 3                      | ..                      |
| Sundries, packages ..      | 92                      | 380                      | 121                    | 263                    | 189                     |
| Butter, boxes ..           | 2                       | 3                        | 5                      | 1,147                  | 3,725                   |
| Apples, cases ..           | ..                      | 4                        | ..                     | ..                     | ..                      |
| Hemp, bales ..             | ..                      | ..                       | 129                    | 386                    | 512                     |

## SHEEP RETURNS.

## BREEDING-EWES AND ESTIMATED PERCENTAGE OF LAMBS FOR THE 1912-13 SEASON.

| District.                      | STUD.    |         |                      |                       |                  |                 |                  | FLOCK.                                 |         |  |  |  |
|--------------------------------|----------|---------|----------------------|-----------------------|------------------|-----------------|------------------|--|---------|--|--|--|
|                                | Lincoln. | Romney. | Border<br>Leicester. | English<br>Leicester. | Shrop-<br>shire. | South-<br>down. | Other<br>Breeds. | Estimated<br>Per-<br>centage<br>Lambs. | Merino. | Estimated<br>Per-<br>centage<br>Lambs. | Crossbreeds<br>and other<br>Longwools,<br>not Studs. | Estimated<br>Per-<br>centage<br>Lambs. |
| Auckland .. ..                 | 2,610    | 6,343   | 351                  | 1,394                 | 784              | 138             | 426              | 95                                     | ..      | ..                                     | 640,516  | 93                                     |
| Napier-Gisborne ..             | 9,105    | 20,623  | 1,917                | 1,809                 | 320              | 2,222           | 803              | 95                                     | ..      | ..                                     | 2,761,686  | 93                                     |
| Wellington - West Coast ..     | 16,688   | 38,018  | 1,668                | 1,361                 | 1,209            | 5,321           | 2,969            | 95                                     | ..      | ..                                     | 2,875,179  | 93                                     |
| Totals, North Island ..        | 28,403   | 64,984  | 3,936                | 4,564                 | 2,313            | 7,681           | 4,198            | ..                                     | ..      | ..                                     | 6,277,381  | ..                                     |
| Marlborough-Nelson-Westland .. | 933      | 4,543   | 122                  | 1,511                 | 435              | 40              | 512              | 101                                    | 109,202 | 80                                     | 584,935  | 90                                     |
| Canterbury-Kaikoura ..         | 1,047    | 2,314   | 9,360                | 21,392                | 4,016            | 4,401           | 7,822            | 101                                    | 355,563 | 80                                     | 2,487,213  | 90                                     |
| Otago .. ..                    | 1,068    | 17,127  | 16,003               | 1,812                 | 676              | 20              | 2,877            | 101                                    | 228,896 | 80                                     | 2,019,729  | 90                                     |
| Totals, South Island ..        | 3,048    | 23,984  | 25,485               | 24,715                | 5,127            | 4,461           | 11,211           | ..                                     | 693,661 | ..                                     | 5,091,877  | ..                                     |
| Totals, North Island ..        | 28,403   | 64,984  | 3,936                | 4,564                 | 2,313            | 7,681           | 4,198            | ..                                     | Nil     | ..                                     | 6,277,381  | ..                                     |
| Grand totals .. ..             | 31,451   | 88,968  | 29,421               | 29,279                | 7,440            | 12,142          | 15,409           | ..                                     | 693,661 | ..                                     | 11,369,258   | ..                                     |

## STOCK EXPORTED.

OCTOBER, 1912.

THE following table shows the numbers and descriptions of stock exported from the Dominion :—

| Port of Shipment. | Horses.       |                     |          | Cattle.             |               | Sheep.        |               |                   |                     | Swine.              |
|-------------------|---------------|---------------------|----------|---------------------|---------------|---------------|---------------|-------------------|---------------------|---------------------|
|                   | To Australia. | To Pacific Islands. | To Fiji. | To Pacific Islands. | To Australia. | To Australia. | To Argentine. | To South America. | To Pacific Islands. | To Pacific Islands. |
| Auckland .. ..    | 9             | ..                  | 18       | 14                  | ..            | ..            | ..            | ..                | 362                 | 15                  |
| Gisborne .. ..    | ..            | ..                  | ..       | ..                  | ..            | ..            | ..            | ..                | ..                  | ..                  |
| Napier .. ..      | ..            | ..                  | ..       | ..                  | ..            | ..            | ..            | ..                | ..                  | ..                  |
| Wellington .. ..  | 1             | ..                  | ..       | ..                  | ..            | ..            | 1             | ..                | ..                  | ..                  |
| Lyttelton .. ..   | 16            | ..                  | ..       | ..                  | ..            | ..            | ..            | ..                | ..                  | ..                  |
| Timaru .. ..      | ..            | ..                  | ..       | ..                  | ..            | ..            | ..            | ..                | ..                  | ..                  |
| Dunedin .. ..     | 1             | ..                  | ..       | ..                  | 11            | ..            | ..            | ..                | ..                  | ..                  |
| Bluff .. ..       | 1             | ..                  | ..       | ..                  | ..            | ..            | ..            | ..                | ..                  | ..                  |
| Totals .. ..      | 28            | ..                  | 18       | 14                  | 11            | ..            | 1             | ..                | 362                 | 15                  |

Following are particulars of the horses shipped: 8 draught mares, 7 draught geldings, 1 light draught stallion, 2 light draught geldings, 3 hack geldings, 11 hack mares, 4 pony stallions, 2 pony mares, 5 pony geldings, 1 hackney gelding, 1 thoroughbred mare, and 1 thoroughbred gelding.

## PRODUCE IMPORTED.

THE following return, compiled by the Customs Department, shows the total importations into New Zealand during the month of October, 1912, of agricultural and farm products :—

| Item.                          | Quantity.     | Value.  |
|--------------------------------|---------------|---------|
| Bran .. ..                     | Nil.          | £       |
| Butter .. ..                   | Nil.          | ..      |
| Cheese .. ..                   | 15 cwt.       | 77      |
| Chaff .. ..                    | Nil.          | ..      |
| Fruits, fresh, all kinds .. .. | 1,795,717 lb. | 21,117  |
| Barley .. ..                   | 3 centals     | 6       |
| Oats .. ..                     | 104 centals   | 30      |
| Wheat .. ..                    | 10 centals    | 7       |
| Onions .. ..                   | 9,645 cwt.    | 5,910   |
| Pollard and sharps .. ..       | Nil.          | ..      |
| Potatoes .. ..                 | 11 tons       | 135     |
| Seeds, grass and clover .. ..  | 1,439 cwt.    | 4,249   |
| Total values imported .. ..    | ..            | £31,531 |

NOTE.—Included in the above is the following returned New Zealand produce: Oats, 104 centals—£30; Potatoes, 7 tons—£55.



## • THE BRITISH PRODUCE-MARKET.

### HIGH COMMISSIONER'S CABLED REPORTS.

THE Department has received the following cablegrams from the High Commissioner for New Zealand. (NOTE.—Quotations, unless otherwise specified, are average market prices on spot.)

London, 12th October, 1912.

*Mutton*.—The market is quiet. Canterbury 4½d. per lb., North Island 4¾d., River Plate 4½d.

*Lamb*.—There has been no alteration in the market since last week. Canterbury 5¾d. per lb., other than Canterbury 5½d.

*Beef*.—The market is dull. Supplies are increasing. New Zealand hinds 3¾d. per lb., fores 2¾d.

*Butter*.—The market is very firm for best quality. There are large stocks of butter of second-class quality in cold-store. Danish 131s. per cwt., Siberian 112s., Australian 115s., New Zealand, nominal, 124s.

*Cheese*.—The market is quiet, small business doing. Canadian white 64s. 6d. per cwt., coloured 65s. 6d.

*Hemp*.—The market is firm at the advance, and is excited, with a good demand for all descriptions. Spot: New Zealand good-fair grade £31 per ton, fair grade £30, fair current Manila £29 10s. January–March: New Zealand good-fair £31 10s. per ton, fair grade £30 10s., fair current Manila £30 10s. The output from Manila for the week was 26,000 bales. Stock New Zealand hemp, 610 tons.

*Wheat*.—The market is quiet. New Zealand long-berried wheat ex granary per quarter of 496 lb. 39s. 6d., short-berried 39s.

*Oats*.—The market is dull, with very little business doing. New Zealand short sparrowbills, ex granary, per quarter of 384 lb., 26s. 6d.

*Beans*.—The demand is improving, but prices are unchanged. New Zealand beans, f.a.q., new crop, 38s. 6d. per 504 lb.

*Peas*.—The market is firm, but demand only moderate. New Zealand peas, part-ridge, 40s. 6d. per 504 lb.

*Linseed*.—The market is dull and unsettled. Bombay 60s. 9d., Calcutta 60s., Plate 56s.

*Cocksfoot-seed*.—The market is very dull.

London, 19th October, 1912.

*Mutton*.—The market is rather quiet, but holders are not anxious to sell in anticipation of moderate supplies coming forward. Canterbury 4½d. per lb., North Island, 4½d. (?)

*Lamb*.—The market is quiet, with a tendency in favour of buyers. Supplies of Home-grown lambs are heavy, and are lowering prices of New Zealand. Canterbury 5¾d. per lb., other than Canterbury 5¾d.

*Beef*.—The market is very dull. Supplies are increasing. New Zealand hinds 3¾d. per lb., fores 2¾d.

*Butter*.—The market is firm at the advance, and active with a good demand. The s.s. "Kaikoura" shipment of unsalted butter arrived in good condition, and is offered at 134s. per cwt. in second hands. Danish 131s., Siberian 112s., Australian 115s., Argentine 125s.

*Cheese*.—The market is quiet, with a tendency in favour of buyers. Canadian White 64s. 6d. per cwt., coloured 65s. 6d.

*Hemp*.—The market remains firm. The spot demand is good, as well as for that to arrive. Spot: New Zealand good-fair grade £31 10s. per ton, New Zealand fair grade £30 10s., fair current Manila £30 10s. Forward shipment: New Zealand good-fair grade £32, fair £30 15s., fair current Manila £31. The output from Manila for the week was 36,000 bales.

*Wool*.—The market remains firm.

London, 26th October, 1912.

*Mutton*.—There has been no alteration in the market since last week. Canterbury 4½d. per lb., North Island 4½d. (?)

*Lamb.*—The market is a shade weaker. Canterbury 5½d. per lb., other than Canterbury 5¼d.

*Beef.*—The market is dull. A large supply. New Zealand hinds 3½d. per lb., fores 2½d.

*Butter.*—The market is quiet, but steady. Buyers are cautious. Danish 131s. per cwt., Siberian 112s., Australian (new season's) 123s., Argentine 123s.

*Cheese.*—The market is dull. Transactions in cheese are very limited. Canadian White 64s. per cwt., coloured 65s.

*Hemp.*—The market remains firm, and is stronger in tone owing to the business which has been done. Reports from Manila indicate prices likely to advance. New Zealand good-fair grade £33 10s. per ton, New Zealand fair grade £32 10s., fair current Manila £33 10s. for any position. The output from Manila for the week was 13,000 bales.

*Cocksfoot-seed.*—The market is quiet, and shows signs of improvement.

*Kauri-gum.*—The market is steady, with a moderate demand. Dark-brown, selected re-scraped 120s. to 160s. per cwt., three-quarter scraped 80s. to 95s., chips drossy 35s. to 45s., re-scraped pale amber £10 to £12, three-quarter pale scraped £7 10s. to £9, diggers' chips, good, 60s. to 70s. Stock, 30th September, 1912, 424 tons. At the auction sales recently 100 packages were offered but only 7 were sold.

*Wool.*—The market remains firm. Current quotations for Bradford tops: 36's, low crossbreds 1s. 2¼d. per lb.; 40's, low crossbreds 1s. 3d.; 44's, medium crossbreds 1s. 4d.; 50's, halfbreds 1s. 6½d.; 56's, quarterbreds 1s. 9¼d.; 60's, merinoes 2s. 2¼d.

London, 2nd November, 1912.

*Mutton.*—The market is quiet but steady, on account of a moderate supply. Canterbury 4½d. per lb., North Island 4¼d., River Plate 4d., Australian 3½d., English ewes 4d.

*Lamb.*—The market is weaker, though not actually lower. Canterbury 5½d. per lb., other than Canterbury 5¼d.

*Beef.*—The market is very dull. The supply exceeds the demand. New Zealand hinds 3½d. per lb., fores 2½d.

*Butter.*—The market is weakening, with signs of a decline. There is less demand. Supply is plentiful. Buyers are holding back expecting prices to go lower. Danish 130s. per cwt., Siberian 109s., Australian 119s., Argentine 119s.

*Cheese.*—The market is unsettled. Prices are irregular. The supply of English is large. Canadian White 63s. per cwt., coloured 64s.

*Hemp.*—The market is strong, and has advanced. Spot: New Zealand good-fair grade £34 10s. per ton, fair grade £33, fair current Manila £34 10s. Forward shipment about the same price. The output from Manila for the week was 31,000 bales.

*Mutton and Lamb.*—River Plate shipments received during October, 1912:—

|               |    |    |    | Mutton.<br>Carcases. | Lamb.<br>Carcases. |
|---------------|----|----|----|----------------------|--------------------|
| London        | .. | .. | .. | 123,233              | 20,548             |
| Liverpool     | .. | .. | .. | 113,840              | 18,779             |
| Cardiff       | .. | .. | .. | 2,000                | ..                 |
| Newcastle     | .. | .. | .. | 8,000                | ..                 |
|               |    |    |    | 247,073              | 39,327             |
| October, 1911 | .. | .. | .. | 246,320              | 56,719             |

London, 9th November, 1912.

*Mutton.*—The market is quiet, but holders are firm. Canterbury 4½d. per lb., North Island 4½d.

*Lamb.*—The market is steady, and prices are well maintained. Canterbury 5½d. per lb., other than Canterbury 5¼d.

*Beef.*—The market is dull, with a large supply of Irish beef. New Zealand hinds 3½d. per lb., fores 2½d.

*Butter.*—The market is quiet, with a tendency in favour of buyers, but is rather unsettled. The average price for the week for choicest New Zealand is 121s. per cwt., Australian 117s., Argentine 117s., Danish 128s., Siberian 109s.

*Cheese.*—The market is slightly weaker, with less demand. Canadian white 62s. per cwt., coloured 63s.

*Hemp.*—The market is very firm. Spot: New Zealand good-fair grade £35 per ton, fair grade £33 10s. Forward shipment, about the same price. Spot: Fair current Manila £35. January–March: fair current Manila £36. The output from Manila for the week was 19,000 bales.